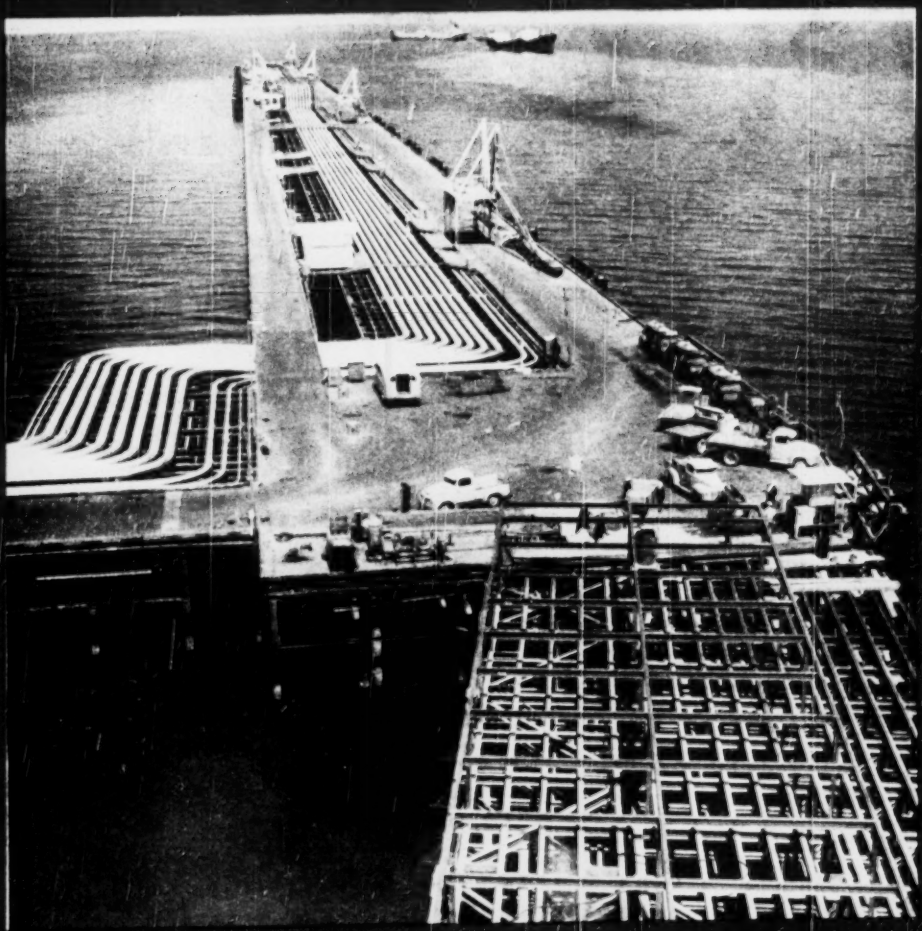
ENGINEERING NEWS-RECORD



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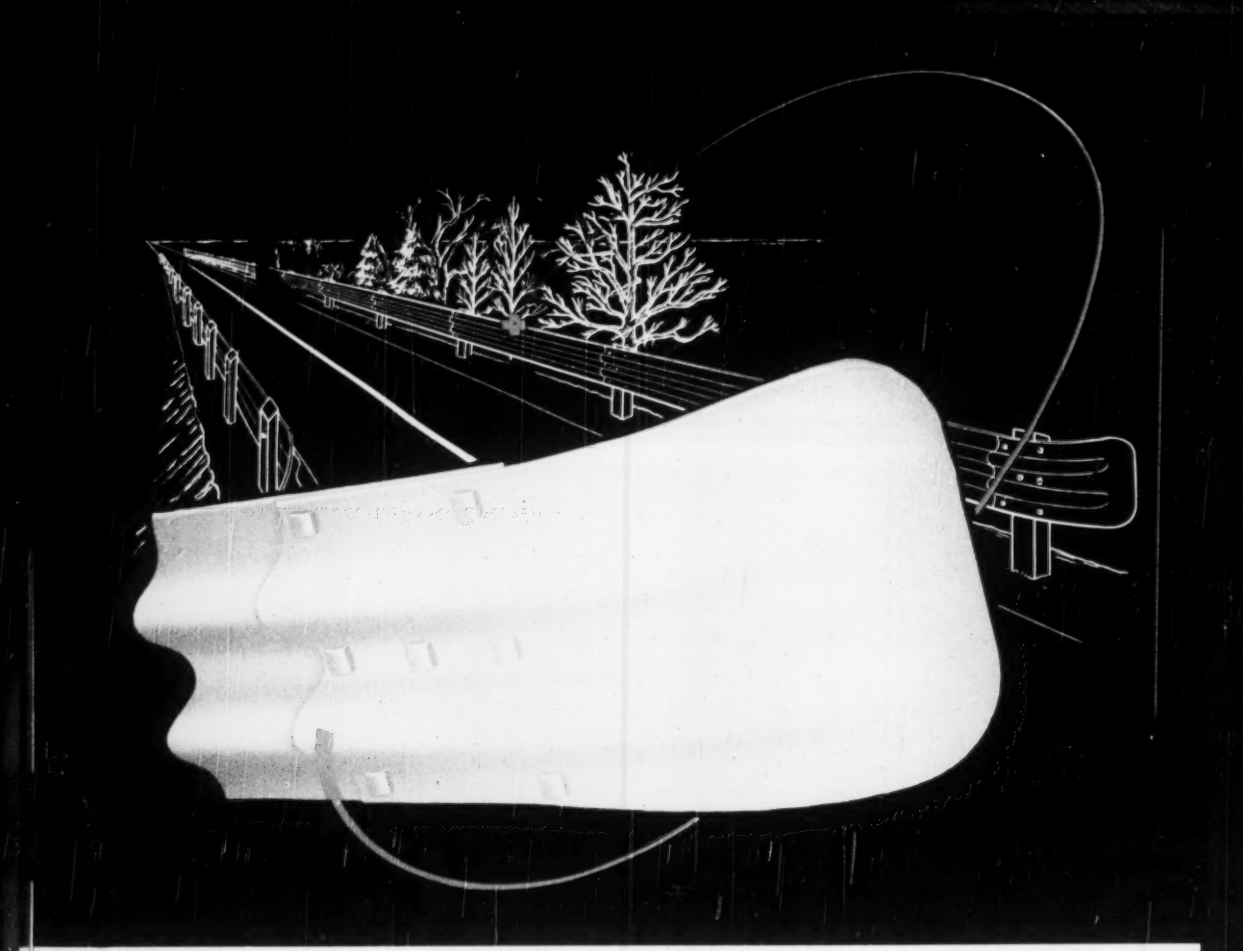

Now accidents are "Cheaper by the Dozen"

With many types of guard rail, maintenance crews were always on the go. A single accident and they had to make repairs or adjustments quickly or leave danger spots unprotected. It was costly and time consuming.

But FLEX-BEAM Guardrail changed all that. Ordinary impacts are not likely to damage FLEX-BEAM. There is nothing to get out of order—no adjustments to make. Should a section be damaged by unusually severe impact the remainder of the installation continues to offer complete protection. And FLEX-BEAM means fewer accidents because it promotes driver confidence, encourages safer driving. There is no dangerous pocketing and the continuous sliding surface automatically deflects a striking vehicle and guides it parallel with the road.

Providing better products to meet specific needs has been standard practice at Armco for more than 40 years. A few examples are HEL-COR Perforated Pipe, Spiral Welded Pipe, STEELOX Buildings, PIPE-ARCH and sturdy MULTI-PLATE bridges.

Today you can bring your drainage and construction problems to Armco with full assurance you will receive all the benefits of long experience, extensive research facilities, and a real interest in helping you solve these problems.

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Steam handling made safe by B. F. Goodrich Burstproof hose

Has new cover 100% tougher, yet costs no more than regular steam hose

THE safest, strongest steam hose in service: B. F. Goodrich Burstproof steam hose—here's how it's made, here's what it will do:

New cover is tougher, lighter—Exterior wire winding can now be safely eliminated and hose weight reduced 50%. B. F. Goodrich engineers have developed a new rubber cover for Burstproof steam hose—100% more resistant to heat, hardening, cracking. Also resists weathering. Resists abrasion better than steel. Sparkproof, for use around petroleum. No other steam hose has this cover.

Stands highest temperatures—Heat is the enemy of steam hose. BFG engineers have developed a new rubber compound that resists rotting from heat, yet flexible enough to stand severe bending. A B. F. Goodrich antioxidant, Agerite, keeps tube live and elastic. Prevents bursting from pressure.

Armored with steel wire—Plies of fabric in ordinary steam hose burn from constant service, then rupture. In B. F. Goodrich Burstproof hose, multiple wire strands of high tensile steel (over 5 miles of wire per 50 feet) are braided at the angle to give greatest strength and flexibility. Openings in the wire braid permit tube to "rivet" itself to other layers of rubber, increasing strength, making hose safer.

Recommended service—For saturated steam pressures up to 200 lbs. p.s.i. For superheated steam up to 388° F.

B. F. Goodrich Burstproof costs you no more than regular steam hose, yet you get these improvements that make it last longer, serve better, and insure workers of protection from scalding and injury. B. F. Goodrich Burstproof steam hose *can't burst from steam or steam pressure!*

Call your local BFG distributor, or write: *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

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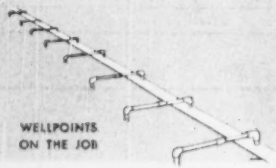

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ENGINEERING NEWS-RECORD

Volume 144 MAY 25, 1950 No. 21

Warren G. Bowman
Editor

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Number of copies of this issue printed 45,765

Managing Editor ... Associate Editors ... Assistant Editors ... Staff Assistants ... Business News ... Contributing Editor ... Domestic News Bureaus ... Foreign News Bureaus ...

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CRANE

WEIGH *all* the features in the Shovel, Crane, Dragline, Pullshovel or Truck Crane you intend to buy! Remember that it takes more than one feature to make a piece of equipment profitable to you. It isn't a type of crawler, a type of control or a type of drive that you want. It is high output! That's what makes money — and you want the combination of advantages that makes high output possible.

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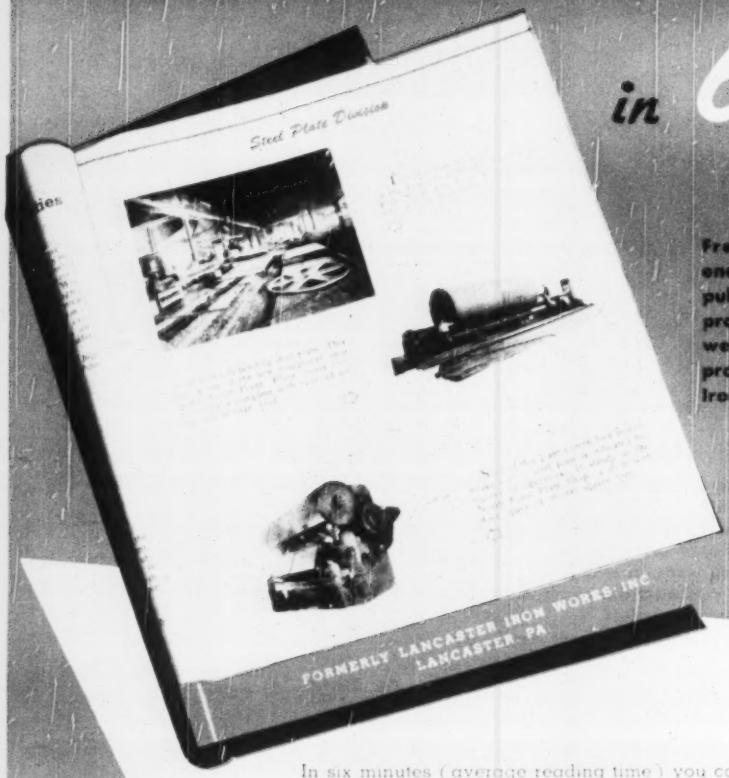
How you may CUT steel plate construction COSTS

in 6 minutes



Free 12-page reference bulletin—recently published — illustrates production facilities as well as some of the products of the Posey Iron Works, Inc.

In six minutes (average reading time) you can review the Steel Plate section of Posey Iron's new 12-page reference bulletin. In those six minutes you may learn of production facilities that can be used to cut your steel plate fabrication costs . . . products that may effect processing economies in your plant.

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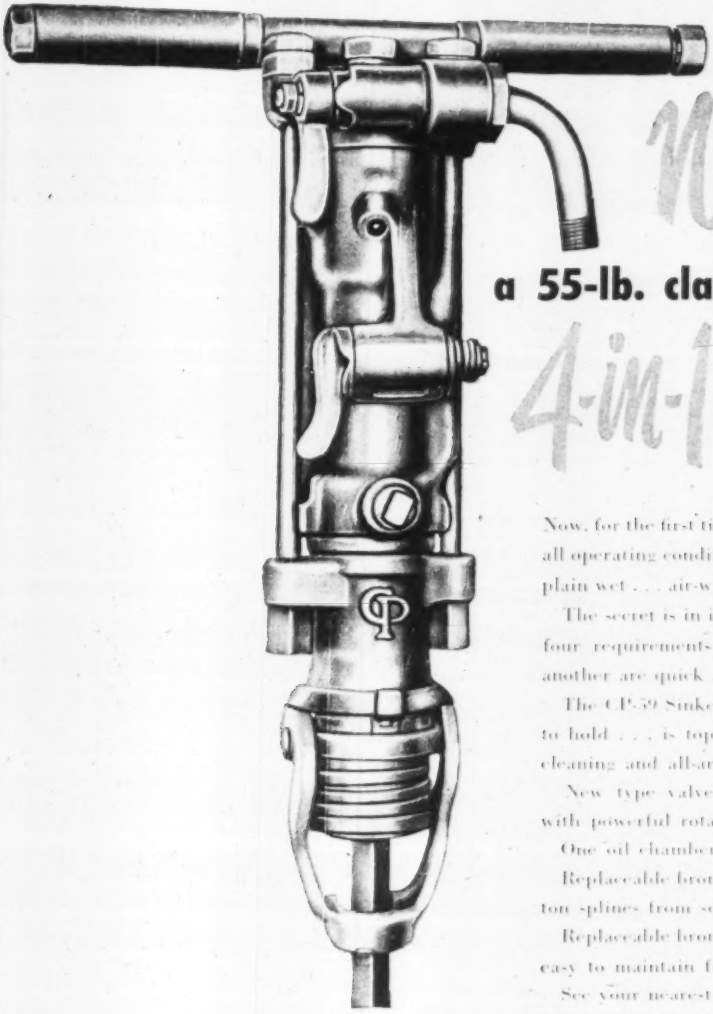

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a 55-lb. class sinker with a 4-in-1 backhead

Now, for the first time, you can get a sinker that meets all operating conditions: plain dry . . . blower dry . . . plain wet . . . air-water operation.

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One oil chamber efficiently lubricates entire drill.

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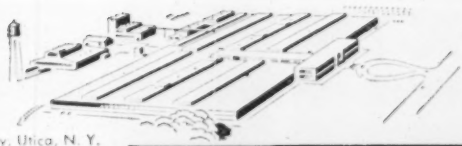

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Protect crawler track mechanisms with *Texaco Track Roll Lubricant*. It's remarkably long lasting, seals mechanisms against water and dirt, reduces wear.

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NEWS BRIEFS

Priorities Problems—The Massachusetts Supreme Court has ruled that a home builder who built without obtaining necessary priorities in 1946 can't collect for the work. The suit concerned a demand for a $2,000 balance owed Clarence Tocci for a home he built in Newton. The court upheld the homeowner's contention that the contract was void because work was done under it which was prohibited by the city's housing laws.

Lots of Work Ahead—The Reclamation Bureau has published another map showing location and dimensions of its projects, completed and under construction. Ultimately, those shown will furnish water for 12,000,000 acres and 7,000,000 kw of power in 17 western states. There are 84 projects shown, of which 24 are in the Missouri River basin.

Private Point 4—Newfoundland's government has announced that it has interested Nelson Rockefeller in sponsoring a complete economic survey to determine feasible development of the province. Power, minerals, pulp and lumber are the most promising prospects now. The hope is to get an economic development which will offset unemployment arising from mainland Canadian competition and collapse of the British market.

Chapman in Movieland—Interior Secretary Oscar Chapman will decide whether and when construction starts on the proposed $10,000,000 San Jacinto Tramway near Palm Springs, Cal., the Hollywood resort. (ENR Jan. 5, p. 33). Chapman gets into the act because the U. S. Forest Service controls part of the right of way the tramway would need.

Sharp Bookkeeping—Phoenix, Ariz., is reviewing its municipal books these days, and profitably, too. A sewer inspector found that a packing house had been served by a 10-in. sewer main for about six years, apparently without charge. The city collected $540. That resulted from a discovery about a week earlier that a railroad hadn't been billed in two years on a three-in. meter. That discovery yielded more than $2,000.

Help Sales Any?—Frederick & Nelson, one of Seattle's swankiest stores, wanted more than an ordinary barn sale around its property during a multi-million dollar expansion. The customary barrel was pushed high

Raymond

MAKES 5 TYPES OF CONCRETE PILES

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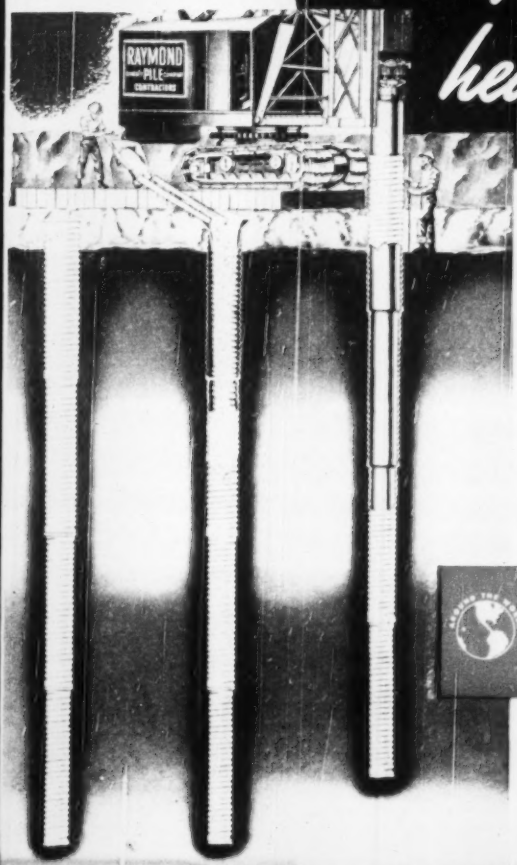
Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements, also cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.

2. STEP-TAPER PILES

FOR *long lengths* WITH *heavy loads*



At left, completed Step-Taper Pile. Center, lifting the permanent steel shell with concrete after internal inspection. Right, driving the pile with rigid core.

Raymond Step-Taper Concrete Piles driven with rigid steel cores and heavy hammers are designed to develop high load carrying capacities at depths to 80 feet. The permanent steel shell maintains the resistance developed during driving. After the shell is inspected internally, it is filled with concrete and cut off at the specified elevation.

You are invited to discuss with our engineers the efficiencies and savings made possible by Raymond's exclusive, original concrete pile designs.

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green and decorated on three sides with flower boxes. Scattered among them were 8-ft high plywood figures of men at work.

Fly to the Park—President Eisenhower has signed a bill authorizing the Interior Department to develop airports near the entrances of national parks and monuments. Interior got $2,000,000 for the program, will work with local agencies and the Civil Aeronautics Administration in carrying it out.

Deceptive—The Boston Finance Commission (watchdog of city contracts) found a featherbedding contractor recently. Said a commission inspector: Specifications for a street paving job in Roxbury called for six inches of base. Sure enough the contractor put in six inches—at either end. In the middle, he shaved it to four inches.

Ice-boxes too?—The Alaska Housing Authority has authorized a $65,000 program for improvements to existing native homes and construction of new dwellings for Eskimos in six villages along the Bering Sea. The program includes 170 housing units, to cost an average of $375 each.

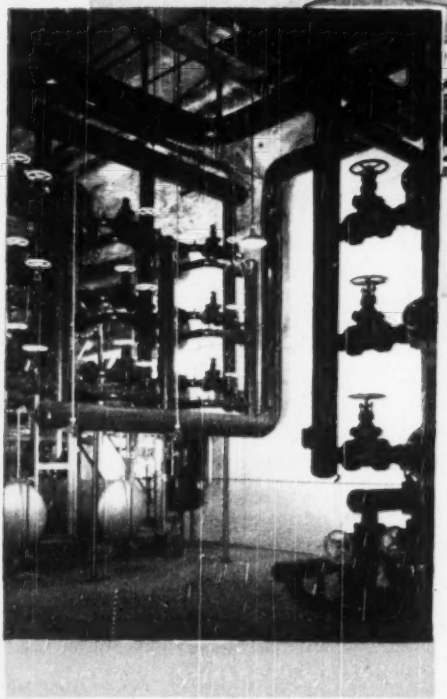
Don't just stand there—New England hasn't been getting its share of federal public housing funds—mostly because of its own inertia or maybe because of traditional reserve. Economist J. L. Phalan chided New Englanders with the statement that the region's present housing construction reservations total only 13,899 units, compared to a national total of 290,000. "Construction in Maine, New Hampshire and Vermont is almost completely without action," said Phalan.

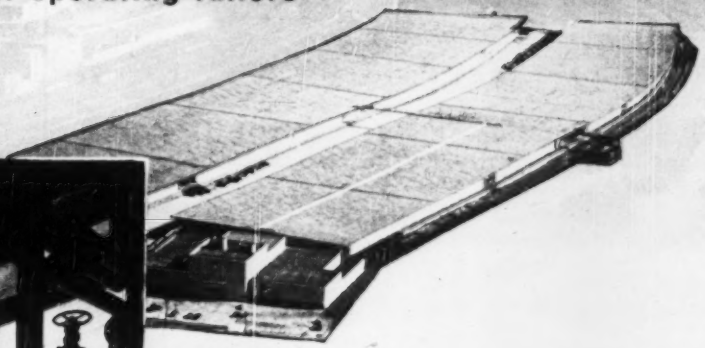
Information stop—Motorists and truckmen on New York State highways this week are being stopped by crews at 49 stations, and asked for information on where they came from, where they're going. Together with a vehicle count, the information is to be used to make close estimates of traffic likely to use the state's proposed Thruway.

Rat race—How to lessen the damage done to stored grain by rats and insects (who've been thriving during the last two mild winters) has engaged the attention of the U. S. Department of Agriculture. USDA set up a joint committee with the Fish and Wildlife Service, the Food and Drug Administration and the Commodity Credit Corporation to see what can be done.

Church Building—In Indianapolis, Ind., 18 churches are planning building projects for this year with a total cost of $2,995,000.

In the World's Biggest Refrigerator
JENKINS VALVES stand guard
against operating failure





More than 1000 Jenkins Valves are used for control of steam, water, brine, in piping systems for refrigeration, heating, fire protection, sanitation and other essential services.

THE 22-acre Alford Refrigerated Warehouse in Dallas, Texas, is "the biggest refrigerated area this side of the polar ice cap." With millions of dollars worth of perishable goods entrusted to constant cold, valves, like all other mechanical equipment, must "perform with unfaltering efficiency.

For this reason, and with the further objective of low maintenance costs, the Alford management standardized on Jenkins Valves. More than a thousand are used along the miles of vital pipelines.

Jenkins builds extra endurance into valves—proved time and again by low upkeep cost records in every type of service. Yet, *you pay no more* for Jenkins Valves, despite this extra value. Let the Jenkins Diamond be your guide to valve economy . . . for new installations, for all replacements. *Sold through leading Industrial Distributors everywhere.* Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros. Ltd., Montreal.

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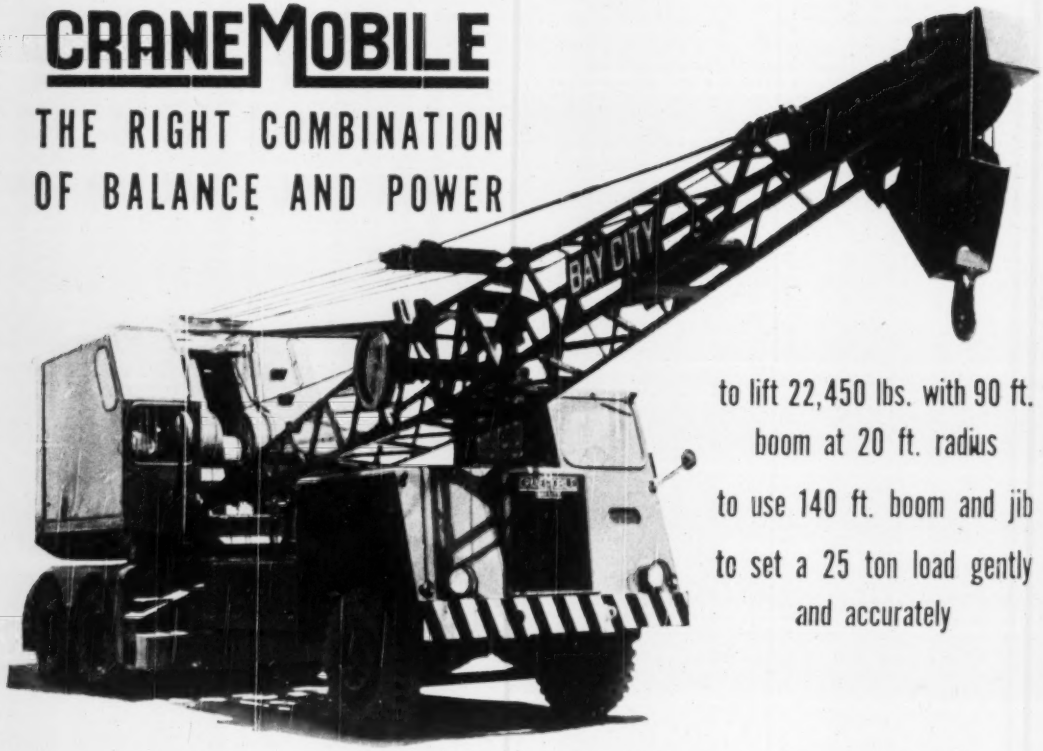

to lift 22,450 lbs. with 90 ft. boom at 20 ft. radius

to use 140 ft. boom and jib

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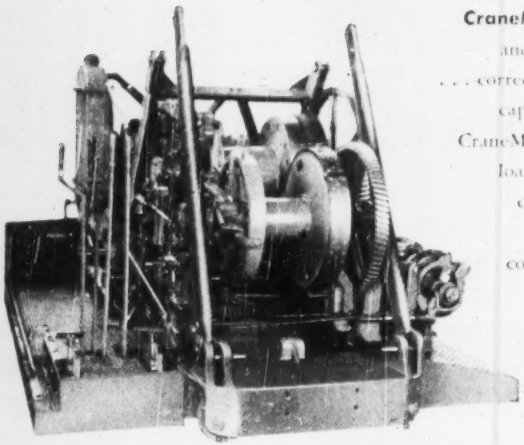

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REPORT ON:

J&L JUNIOR BEAMS

J&L STEEL

Left—Workman easily guides notched Junior Beam into place during construction of Horace Mann School.

Below—Completed school showing clean functional design and unique cantilever construction.

Remarks: J&L STEEL JUNIOR BEAMS solve unique design problem *AT LOW COST*

At the Horace Mann School in Warren, Ohio, J&L Junior Beams have again demonstrated that they can do a better job in unusual applications, as well as in ordinary styles of buildings.

Notched over lintel beams and cantilevered three feet beyond the outside walls, J&L Junior Beams support not only the roof but also an attractive permanent sun shield over classroom window walls.

Because of their versatility and adaptability, J&L Junior Beams go far towards meeting the demands of today's builders. They cost less to buy and less to erect. At Horace Mann, Warren Engineering Company, who erected the school, assisted by J. A. McMahon, Ltd., Niles, Ohio steel fabricators, has found that lightweight, 12" Junior Beams, 30 ft. long, may be easily raised, placed and bolted directly into place by three men with the aid of only a hand-operated winch.

This means *dollars saved* through speed of erection, elimination of secondary operations, and ease of handling. Yet in light structures, J&L Junior Beams often offer all the advantages of heavier structural members.

Junior Beams, made *exclusively* by J&L, are the lightest weight hot-rolled steel beams available.

In schools, office buildings, apartments, residences, industrial buildings, hospitals, and other light occupancy structures, J&L Steel Junior Beams offer the *modern* builder many advantages. They are economical . . . fireside . . . rigid . . . shrink-proof . . . termite-proof . . . easy to install . . . low in maintenance . . . and are permanent.

ARCHITECTS • BUILDERS • CONTRACTORS

It will be worth your while to follow the lead of Arthur E. Sidells, architect for the Horace Mann School, Warren S. Holmes, consulting architect, and William C. Fisher, structural engineer on the job. Send for descriptive literature and engineering data on J&L Steel Junior Beams and J&L Junior Beam floors.

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The New INTERNATIONAL TD-24

HERE'S WHAT THE

Positive all-weather starting

Separate reverse lever

Self load and run

Cut waste shifting time

INTERNATIONAL

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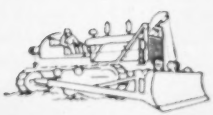

CHAMPION of Crawlers

"The TD-24's work right along on slopes so steep we have to cut them down before other tractors can climb them even without loads," says Bob Rardin of Rardin Brothers, Akron, Ohio. "They are fast tractors, easy to shift and have plenty of power. This combination really moves dirt." His TD-24 was equipped with a bulldozer.

"It will out-buck any tractor I've ever run," says Harold Wooley's operator, Drain, Oregon, "and sure push dirt up hill—and climb steep grades." His TD-24 works regularly on 30% to 50% grades, building mountain roads.

"I wouldn't have anything else," says another Oregon operator. He works for V. R. Russell & Sons of Valsetz. "It's sure fine on bulldozing; best dirt mover I ever got hold of."

That's the way owners and operators talk about the International TD-24 Crawler. It has earned their praise, for it does everything any other big tractor can do, *plus many things that NO other tractor can do.* The TD-24's versatility makes it the most useful and profitable earth-mover in any equipment line-up.

Visit your International Industrial Power Distributor for a demonstration. Then ask yourself how long you can get along without this big red worker and the extra earnings it will produce.

INTERNATIONAL HARVESTER COMPANY
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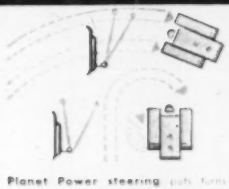
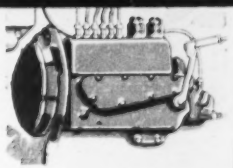
Instant speed change up or down one speed, or stop, without declutching. Planet Power drive does it!



Planet Power steering puts turns with power on both tracks: feathered turns and pivot turns at your fingertips.



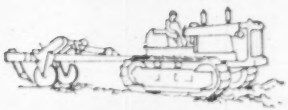
Torque Control feature of fuel injection pump increases engine torque when needed to overcome overloads.

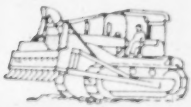
Work on grades up to 100%. Its power, ground contact, balance and lubrication are right for licking any grade.

Handle heaviest loads on gradual turns as easily as straightaway because both tracks are powered in the turn.

Push or pull through tough going. The engine delivers extra power when its r.p.m. is pulled down by load.

INDUSTRIAL POWER





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FOR BULK HAULS

OF ANY POWDERED OR PULVERIZED MATERIAL—
90 TO 130 BARRELS PER LOAD

THIS Fruehauf Bulk Cement Trailer fits the requirements of a specialized hauling problem—yet it is not a "specially" built unit with a premium price tag. It's a standard Trailer in the Fruehauf line, with such outstanding features as Fruehauf's exclusive Gravity-Tandem Suspension or "Multi-Rate" single-axle Suspension with 2-speed Vertical Supports—features that make Fruehauf Trailers the world's best!

The discharging mechanism is powered by a 21 H.P. gas engine. It is located under the tank in an enclosed compartment mounted well forward to prevent the entrance of harmful dust. Self-lubricating twin screws convey the load to the rear—dump anything up to 1 inch in diameter at 5 barrels per minute. Screws may be operated singly or together. Triple control levers allow operation from engine compartment, or from either side of the rear of the Trailer. 2 baffles (within the tank) prevent load shifts. Manholes on the tank top, located ten feet apart, provide fast, easy loading. Curbside ladder allows easy access to manholes. For complete information and specifications on the Fruehauf Bulk Cement Trailer, write—

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"ENGINEERED TRANSPORTATION"

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FRUEHAUF TRAILER COMPANY

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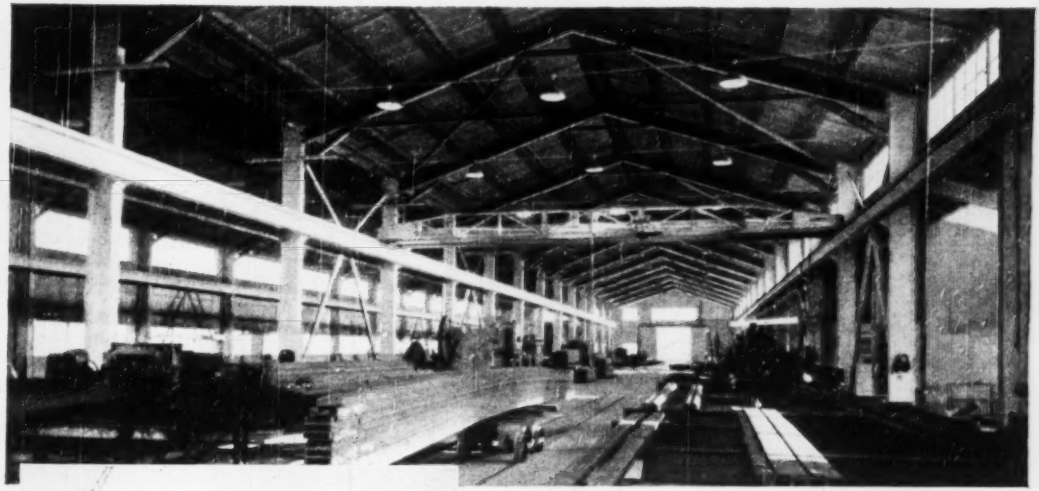
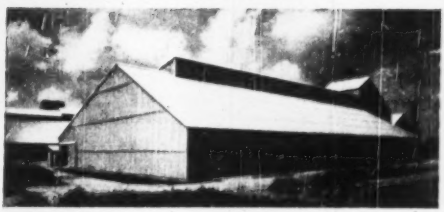


This large steel fabricating plant (interior above) shows how Luria Buildings extend the advantages of standardization to even the heaviest type of industrial structures, which heretofore required special planning and engineering throughout.



Although the requirements for this fertilizer building were special in many respects, they were easily met by simple adaptations of Luria's basic standard structure.

And here's a complete industrial plant, consisting entirely of Luria Buildings—erected in record time and at lowest possible cost.

Save money...save time...save "headaches" and get a fine, rugged steel-frame LURIA STANDARD BUILDING *that's tops in quality!*

With Luria Buildings, you get *what* you want, *when* you want it—without the usual time-consuming details and endless delays. For here is a complete line of permanent, heavy steel-frame structures that are already engineered for you—with structural members carried in stock, completely fabricated and ready for erection. Yet the Luria system of standardization is so *flexible* that these buildings can be custom tailored to your exact requirements.

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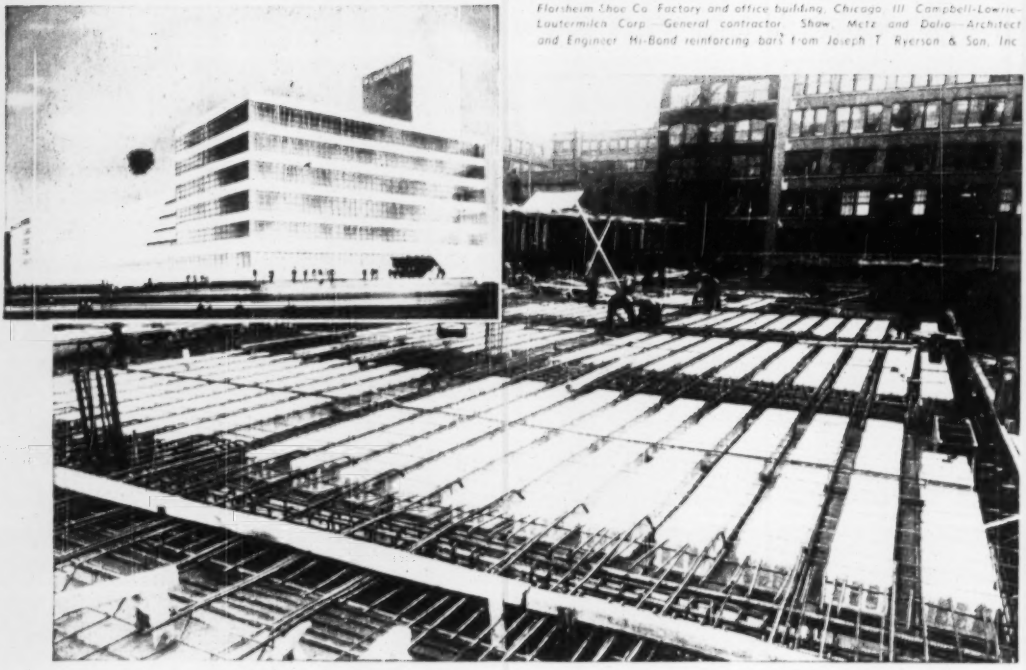

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THE CONSTRUCTION WEEK

MYSTERY METHOD—Governor Thomas E. Dewey of New York sired a nice mystery last week, when he was reported to have said that a new concept of bridge foundation construction—heretofore a military secret—was available for use on the state's proposed Thruway crossing of the Hudson River, should rock prove to be at unreachable depths. The "military secret" cloak can be quickly cast aside—but there may be some substance to the "new bridge foundation concept." It is known that the consulting engineering firm of Madigan-Hyland is studying the bridge problem for the state. It is also known (ENR Jan. 26, p.40) that this firm designed a pier for New York's waterfront that would be partly supported by the buoyancy of the water—in effect a large part of the dead load would be resisted by the upward lift of the water and would therefore not have to be supported by the foundation material. This is something of a new concept, and could perhaps be applied to the Thruway bridge piers. Maybe it's the governor's "mystery method."

SERIOUS TRY—Evidence of the serious intent of New Englanders who are out to get a steel industry for their area is the formation of a new organization—the New England Steel Development Corp. Clifford S. Strike, head of F. H. McGraw Co. of Hartford and New York City, was elected president. Board members represent the New England Council (under whose wing the corporation was formed) and many major industries in the area. First move of the new corporation was to employ the consulting firm of Coverdale and Colpitts of New York to survey economic feasibility of locating such a steel mill in the New London, Conn., area. New England's interest dates from the discovery of huge ore deposits in Labrador and couples in with the drive for industry decentralization.

ANOTHER BUREAU?—In a statement unusual from a scientist, Irving B. Langmuir—Nobel prize-winning rainmaker—sees the need for government regulation to keep "promiscuous artificial rainmaking from ruining the nation's agriculture." Dr. Langmuir told an audience at Boulder City, Nev., that overseeding of clouds with silver iodide particles can have these results: Prevailing winds can carry the particles over a wide area, might cause rain where crops were in an advanced stage, produce violent rainstorms that would cause floods.

DEATH KISS?—Washington observers are calling President Truman's plan to put the Reconstruction Finance Corporation under the Department of Commerce (ENR May 18, p.27) a kiss of death. They put it this way: In a world of government-insured loans and maybe even capital banks, the scope of RFC must shrink anyway, and, under a Secretary of Commerce who also runs the loan insurance program, RFC can't play anything like its once independent role. Reasons for the predicted demise are many, but most experts think the increasing criticism of the agency's activities is the reason. Despite a good depression record (it was Hoover's main attack on the depression) and a magnificent job in financing the wartime arsenal, RFC has gotten into one hot bath after another since the war—notably the $37.5 million fiasco of its attempts to push prefab housing through Lustron Corp.

SEAWAY, OFFENSIVE: FLOP—Despite the heavy guns brought to bear by the government and private industry (ENR May 11, p.17) the battle for the St. Lawrence Seaway is over for at least a year. The House Public Works Committee has shelved a bill that would approve a U. S.-Canada agreement for development of the river. Even before concluding its own public hearings, the committee voted to defer action until the Senate considers the bill. And the Senate isn't expected to get around to the St. Lawrence until 1951.

HOOVER REPORT—Washington is watching with great interest the progress through Congress of the 21 reorganization programs generated by the Hoover Report. The conclusion is inescapable: Congressmen like to say they are all for reorganization, but when the voting comes they have a change of heart. At the moment, it appears that the President isn't going to get much more than 50 percent of the 21 plans he sent to Congress in March. What worries the administration—and the Citizens' Committee for the Hoover Report—is that although the turndowns so far haven't been too significant, each time a turndown comes it gives further ammunition to pressure groups fighting other programs. And some really big reorganizations are coming along—including the merging of all government public works agencies.

PUBLIC (STEAM) POWER?—Fourteen electric co-operatives in Maine, New York, Vermont and New Hampshire are investigating the possibility of forming one or more generating federations to build steam plants. Funds would come from borrowings from the Rural Electrification Administration.

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● Gristede Bros. Inc. have 140 stores in and around New York City. Each store carries 5,000 items, twice as many as average food stores. Assemble and distribute that many items, provide special storage conditions of temperature and moisture . . . load and unload . . . handle and convey . . . stack and unstack —and you need a lot more than just four walls and a roof! Gristede's new warehouse—555,000 sq. ft. floor area, all heavy-duty concrete construction—is tailor-made to meet these multiple problems. Specialized know-how in design and construction, including concreting throughout with Lone Star Cement, 26,000 bbls., invests this new warehouse with the same "Quality and Service" attributes which have distinguished Gristede operations for the past 59 years.

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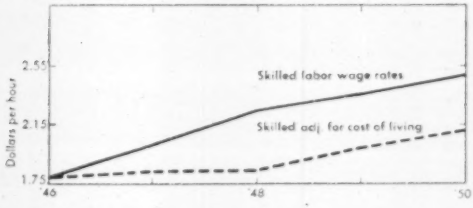
CONSTRUCTION TRENDS

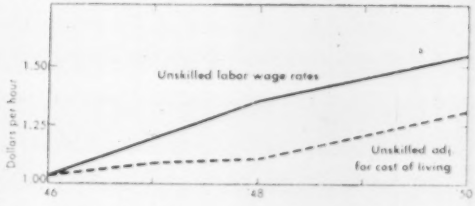
Real income up sharply for construction workers

Cost of living drops as:

1 skilled wages rise

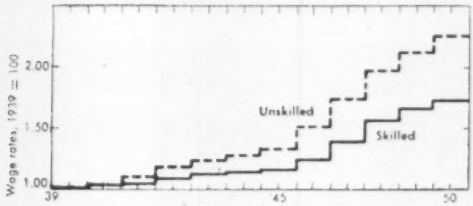


2 unskilled wages rise

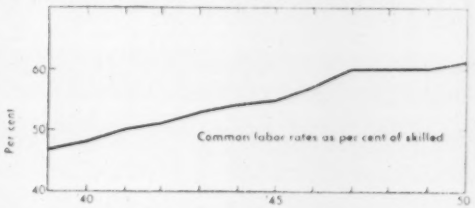


But wage increases are smaller

3 for both skilled and unskilled



4 and ratio of common to skilled levels off



What's on the record about wages in construction makes an interesting picture.

Here are the highlights—as shown in the four charts:

1. Wage rates are still climbing. Typical settlements this year range between seven and 12.5 cents an hour. They're reported in ENR in detail as they come along.

2. In the last two years, construction workers have made a rapid advance in real wages. During the war, even wages advancing, the rising cost of living limited the gains in what paychecks would buy. Now, with prices falling, construction workers are scoring real gains, 21% for skilled workers, 26% for unskilled workers since 1948—in their living standards.

3. Wages are still rising—but the rate of increase is slowing down. Chart 3, which puts the wage rates on an index basis, with 1939 equal to 100, shows that the biggest gains from year to year, percentage-wise, came right after the war.

4. The differential in wage rates between skilled and unskilled workers seems to be holding fairly steady. Chart 4, which shows common labor wage rates as a percent of skilled rates, reveals that where common labor rates averaged 47% of skilled labors' in 1940, they are now up to about 61%. The ratio held steady through 1947 and 1948, however, and may be leveling off at about its present point.

What's not in the figures is even more interesting. The industry badly needs some statistical information that will measure what has been happening. But there are some clues.

1. More and more unions either have contracts that don't allow for wage increases this year, have stabilization plans that limit them, or will settle without a wage increase.

The Bureau of Labor Statistics estimates that only about 55% of building workers received wage increases in the 1948-49 round of bargaining. In the years right after the war, it was about 95% each year.

2. Workers are doing much better than these figures indicate. This winter, particularly, continuing high activity in construction kept gangs going through the year. Before the war, seasonal swings in construction meant that many worked only 150 to 180 days a year, which kept annual earnings relatively low. Now the average would be much higher since in many areas men work the year around.

These figures, too, don't reflect premium and overtime pay.

Also, there is no measure of the industry's productivity.

Finally, we do not yet have any overall picture of one of the most important aspects of the wage picture, welfare and pension plans. They're cropping up more and more. New York bricklayers this year gained their first pension plan. In Chicago, common laborers secured a wage increase of 10 cents—of which five cents was to go for a new welfare plan.

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Dodging H-Bombs

RALPH WALKER, president of the American Institute of Architects, refuses to be stampeded into planning cities to minimize possible damage from H-bombs.

There is much common sense in what Mr. Walker says. If atomic scientists are correct in their statements as to the much greater destructive effect of the H-bomb as compared to the A-bomb, there seems to be no justification for making plans that would be a constant source of inconvenience to the occupants of cities on the slight chance that the design might afford a little more safety.

Sound arguments can be made for decentralization of key industries as a means for reducing the effect of any type of bombing on the nation's capacity to defend itself against attack. But when it comes to planning the town to accommodate the people who operate those industries it would be ridiculous to require the people to live underground like moles or to disperse them so widely as to interfere with the normal activities of community life. Planning should mostly be directed toward providing the maximum of human comfort and convenience, with economy. The results of such planning may, quite incidentally, provide better protection against bomb damage than is afforded by our present urban concentrations. But to go to expensive and radical extremes, on the off chance that safety from bombing can be assured, is not sensible.

New Backers for the Seaway

THAT A NEW SHIP CANAL would be built some day along the St. Lawrence River between Lake Ontario and Montreal has appeared inevitable for many years, yet proponents of the project never could make a sufficiently real showing of economic justification to overcome the strong opposition of the railroads and some eastern cities. Now the tide has turned and support comes from a source that was unforeseen in past years—the midwest steel companies. Looking to future supplies of iron ore from Quebec and Labrador, representatives of the Armco, National, Republic, Wheeling and Youngstown companies have urged the House Public Works Committee to approve the project. President Truman and Secretary of Commerce Sawyer already are on record as urging an early start.

This new support from powerful companies is of great value to the undertaking in providing additional economic justification. But it hardly means that the actual construction of the seaway will be started soon. Congress already has shelved the project for this session. Also a new agreement with Canada probably must be written as the 1941 agreement is so hopelessly out of date as to be of little value. For example, its allocation of the cost of the work between the two countries was based on estimated cost for the combined power and navigation project of $559 million. Secretary Sawyer now puts the cost as of today at $803 million. Questions raised by the power aspects of the undertaking also appear destined for active discussion in Congress.

Under these circumstances, delays appear inevitable; yet the status of the project has changed definitely. When actual construction will start now appears to be simply a matter of determining how long it will take to remove the legislative and diplomatic hurdles.

Woof, Woof!

WE CANNOT GET EXCITED over the announcement of the anti-trust watchdogs of the Department of Justice that they are going to start action against organizations of architects and engineers that set minimum fees for professional work. Apparently they are flushed with their success in getting the U. S. Supreme Court to declare the minimum fees set by the Real Estate Board of Washington to be in violation of the anti-trust laws (ENR May 18, p23). But that victory had little significance, as the court itself admitted when it observed that the real estate boards apparently had made no effort to compel members to adhere to the minimums. Criminal action could only be brought on a showing of such compulsion.

Also, the Supreme Court specifically said it was not passing on the matter of fees set by professional men when it ruled on minimum fee setting by real estate boards for services, which it characterized as commercial operations.

In setting minimum fee scales for professional services both the American Society of Civil Engineers and the American Institute of Consulting Engineers have generally taken the position that such minimums were being set up as a guide for use in dealing with prospective clients rather than as the basis for disciplinary action against members who charged less than the minimum. There is nothing illegal in using a minimum fee schedule as a guide, but some of the state societies of professional engineers have declared that charging fees below those set by the society will result in disciplinary action. Now that the Department of Justice has announced that it will seek to have the setting of minimum fees by architects and engineers declared illegal, it might be well for such state societies to review their earlier action.

Minimum fees have proved to be useful as guides for prospective clients, they never have had any practical value as a means for preventing fee-cutting, which is the area that is of interest to the anti-trust division of Department of Justice.

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During the day, this corrugated flush with the surface traffic marker, made with Atlas White Cement, forms a bright white guideline in contrast to the pavement grey.

At night, the saw-tooth faces of the marker catch headlight rays and reflect them back to the driver. And in rainy weather, the wet faces become even more mirror-like, giving good visibility when it is most needed.

In addition, drivers can keep safely in lane by sound, because when a car veers out of lane, its tires ride the ribbed surface of the marker and produce a distinct warning hum.

So, in fair weather or foul, day or night, this Double-Duty Traffic Marker keeps drivers safely in the right lane . . . protects them by *sound* and *sight*.

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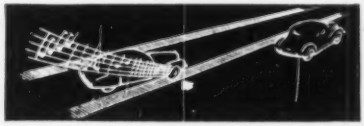
ATLAS WHITE DURAPLASTIC.*

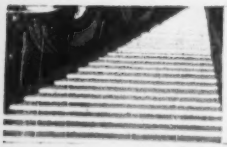
At night, ribbed faces catch headlight rays, reflect them back to the driver. On rainy nights, the film of water makes the Double-Duty Traffic Marker more mirror-like, when good visibility is needed most.



When a car crosses the corrugated marker, the action of the tires creates a distinct hum, or whine. It is audible day or night and in clear or foggy weather. Drivers can hear as well as see it.

* "Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

UNS-TM-11



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ENGINEERING NEWS-RECORD

MAY 25, 1950 VOL. 144 NO. 21

Private mortgage investors sought in new legislation

Housing officials, bankers, Congressmen agree that new device is needed to attract private capital into guaranteed mortgage market—Legislation is proposed

Federal housing officials planned this week to offer Congress a bill aimed at shifting the mortgage buying load from the government to private investors. The bill would give the mortgage bankers a tangible target to shoot at in hearings before the banking committees of the Senate and House.

Bankers, Congressmen and housing people have agreed for months that some device must be found to attract private capital into large-scale purchase of government-guaranteed mortgages. The Federal National Mortgage Association, RFC subsidiary, by March 20 had committed its $2.5-billion authorization to buy FHA and GI paper. Nearly $500 million of commitments—mostly for VA loans—had inundated 31 field offices in the last three weeks before the stop order went out from Washington.

A month later, the 1950 Housing Act gave Fannie Mae (the family name for FNMA) another $250 million, to be used for purchase only, not for commitment. Fannie Mae, two weeks ago (May 12), issued new regulations to keep that money from going too fast in over-the-counter purchases. The doors were reopened to lenders this week—under the new restrictions that Fannie Mae feels sure will prevent a flood of offers.

• **Includes cushion**—A cushion for FNMA is included in the proposed bill. Some $250 million of new borrowing power would be added to the kitty, upping the total to $3 billion. This money and receipts from Fannie Mae's mortgage sales—which amounted to $115 million during March and April—could be used for over-the-counter purchases only, but on an entirely new basis designed to restore the agency to its original purpose as a standby stabilizer of the market.

Achievement of that purpose would depend upon the success of the other part of the bill—to set up government-chartered private corporations for purchase of mortgages.

During the last year and a half, liberalizing amendments to the National Housing Act have encouraged lenders to use Fannie Mae as a source of credit, instead of a market place for cash sale of mortgages. Twelve-month advance commitments for future mortgages—on properties planned or under construction—have given lenders a guaranteed takeout, enabling them in fact to utilize government credit as a basis for new lending, with additional brokerage fees resulting.

• **Buy VA, FHA paper**—As one important change, the new bill would allow purchase of VA and FHA loans from any holder. At present, Fannie Mae can buy a mortgage only from the original lender. Resale kills any chance of even offering the mortgage to Fannie Mae. That requirement has been partly responsible for reducing the private resale market for VA and FHA paper.

Other new stipulations would modify existing FNMA rules for purchase of mortgages from the holder. Designed primarily to put a brake on too-rapid disposal of mortgages to Fannie Mae, the new system would also set up what amounts to a six-month line of credit for a lending institution. The new scheme would limit sales to FNMA in any six-month period to 50% of VA purchases made by the institution during the preceding six months. The mortgages offered would not have to be the same ones bought in the prior period.

In addition, the new bill proposes to give Fannie Mae specific authority to require aging of the mortgage before the paper becomes eligible for purchase. This permissive authority may suggest six months as the period that an institution must hold a mortgage before selling to the government agency. Present law says nothing about an aging period.

• **More money due**—Fannie Mae is almost sure to get more money and new mortgage-buying regulations from the present Congress. Much less certain of enactment are the present proposals for authorizing private mortgage

(Continued on page 26)

Carry Ohio Compact fight to U.S. Court

A West Virginia court ruling that apparently invalidates that state's participation in the two-year-old Ohio River Valley Water Sanitation compact will be carried to the U. S. Supreme Court.

The ruling—handed down by the West Virginia Supreme Court of Appeals a month ago (ENR May 4, p. 21 and April 20, p. 27)—would prevent the state from participating in the eight-state pact for cleaning up the waters of the Ohio River Valley. The state court made its decision after West Virginia State Auditor E. B. Sims had declared he would withhold the state's monetary contribution to the Ohio River Commission, and challenged legality of the compact.

Eight states—Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia and West Virginia—are joined in the compact.

The state court held that the pact delegates state powers unlawfully.

• **Appeal planned**—With other signatory states deeply concerned that the effect of the decision might break up the commission and nullify its work, Joseph L. Quinn, Jr., chairman of the commission, said last week that West Virginia representatives of the commission would appeal the state court's ruling to the U. S. Supreme Court.

Mr. Quinn said that the West Virginia attorney general will take the appeal to the highest U. S. court, in accordance with recommendations of the attorneys general of the states concerned, made at a meeting at Columbus some weeks ago.

"At their meeting," Mr. Quinn said, "the attorneys general concluded that a review by the U. S. court was warranted because the compact has been approved by the Congress.

"Furthermore, such a review is considered an appropriate step toward furtherance of interstate action in joint control of pollution abatement."

House OK's road-aid bill; Senate studies local aid

As the Senate opened hearings last week on a federal aid highway bill which would authorize assistance for farm roads, the House passed by a thumping 246-54 vote a federal aid bill whose program is quite similar to that advocated by the American Association of State Highway Officials.

The Senate Bill (ENR Apr. 27 p. 24) names $150 million for local roads, a practice not heretofore approved by Congress. The House bill spurns this device (ENR April 6, p. 25). It provides $500 million for regular federal aid and $70,000,000 more earmarked for the interstate system.

The decisive nature of the House vote and the fact that it was a roll call vote, strengthen the probability that the final version of the bill will be close to that sought by AASHO. Traditionally, House conferees find it difficult to recede on major points when their version has been passed by roll call vote. This vote was preceded by House refusal of an amendment which would have dropped the $70,000,000 special aid to the interstate system. This proposal is a new one in the pending bill, and is aimed at helping get the strategic interstate system into as good shape as possible as soon as possible.

Seek mortgage capital

(Continued from page 25)

bankers. If the chairmen of the Senate and House banking committees introduce the bill as drafted, the bankers may be counted on to offer strong criticism of its mortgage corporation features.

As sent to the Hill, the bill would authorize the Administrator of the Housing and Home Finance Agency to charter mortgage corporations having a minimum capitalization of about $2 million. These corporations could sell debentures to the amount of 25 times their capital, with an increase of the debenture ratio to 40 to 1 at the discretion of the administrator.

Both the minimum capital stock requirement and the 40-to-1 ratio were recommended by the mortgage bankers several months ago. At that time, testifying on the 1950 housing legislation, the bankers won the acclaim of the Congressional committees by acknowledging that their failure to furnish a secondary market was in large part the cause of Fanny Mae's deplorable condition. The bankers and committee members agreed upon the necessity of creating a private secondary market.

WINNIPEG FIGHTS BACK—This earth mover bogged down atop the Norwood Dike, Winnipeg, in the weeks-long fight to save the city from the Red River. The machine became mired in a soft spot resulting from long exposure to the flood water. (Wide World Photo)

Winnipeg sees flood relief a week off

Winnipeg began to see the first signs of respite in its five-week flood battle this week, but any major drop in water levels there remained a week away. (ENR May 18, p. 25).

As the fifth flood-bound week began May 21, there still had been no breaks in any major dikes. Nor had any major failures of engineering structures occurred. But through the fourth week, the water had not varied more than a tenth of a foot from the all-time high level of 30.5 ft above datum. The gage point for a mass evacuation of the city remained at 32.5 ft, a mark which hadn't been approached within two feet.

Authorities continued to regard the situation gravely, maintaining a ceaseless watch over the dikes, even though the Red River of the North had started dropping across the U. S. border. At Emerson, on the international boundary, there had been a slight recession in water levels. But between Emerson and Winnipeg, 600 sq mi remained inundated. Six of the city's 49 sq mi area remained under water.

Army engineers decided May 19 to pierce one of the city's defenses, the Canadian National Railways embankment which forms a part of the McGillivray dike. This dike formed a large area of still water, whose level was up to 37.1 ft above datum because of restricted water channels. Piercing the embankment would allow some water to return to the Red River channel and lower McGillivray "Lake". Water level was perilously close to the top of this 6-mi, sandbagged earth dike and railway fill.

Damage estimates ranging from $100 to $300 million have been heard.

Clyde Potts, authority on water supply, dies

Clyde Potts, sanitary engineer and former mayor of Morristown, N. J., died in that city May 19. He was 75.

A graduate of Cornell University in 1903 in civil engineering, the greater part of his active life was spent in water supply and sewage disposal work in New Jersey. He designed or rebuilt the water supply systems of many towns and cities in the state, including Jersey City, Atlantic City, Bound Brook and Morristown. He also designed many sewer systems, including the Rockaway Valley System serving a number of communities.

In more recent years, Potts acted as consultant on water supply for Athens, Budapest, and other cities in and around the Balkans.

Morrison-Knudsen takes control of Ferguson Co.

Morrison-Knudsen Co., Inc., of Boise, Idaho, announced this week it had acquired controlling stock in the 52-year-old H. K. Ferguson Co., Cleveland and New York industrial engineers and builders.

The purchase of the stock interest—involving "several million dollars" according to a joint statement issued by the two organizations—broadens the activities of the Morrison-Knudsen firm. Ferguson has long specialized in the design, construction and installation of plant equipment under a single contract with a single comprehensive organization.

Stock control was purchased from a group headed by Sutton Ownin and John Ownin III of Nashville, Tenn.

Experts named to study New York water policy

A panel of five consultants will advise New York City on new water sources. The panel has been formed at the suggestion of Mayor William O'Dwyer's Committee on Management Survey, to assist a special subcommittee on water policy and management, formed recently.

Consultants on the panel will be: W. W. Horner, consulting engineer, St. Louis; Louis R. Howson, consulting engineer, Chicago; Samuel B. Morris, chief engineer and general manager, Los Angeles Department of Water and Power; Thorndike Saville, dean of the College of Engineering, New York University; and Abel Wolman, Johns Hopkins University.

• **Three of the five**—Wolman, Horner and Howson—fill key positions in the Engineers' Joint Council task force making studies for the President's Temporary Water Resources Policy Commission. (ENR Apr. 13, p. 26).

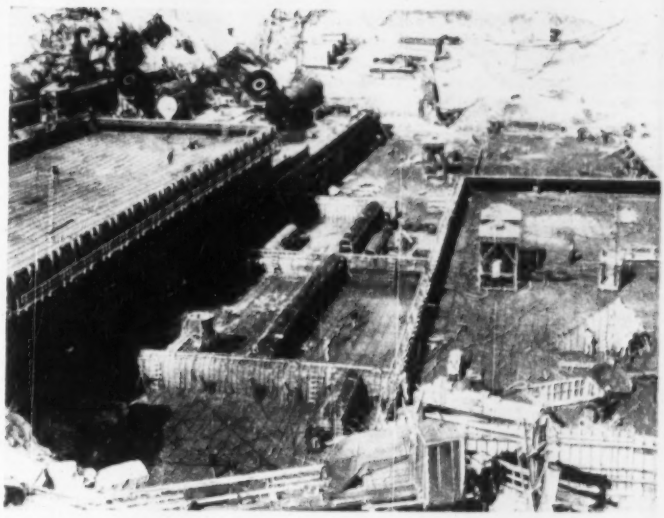
At least one other engineer probably will be named to assist the panel in gathering all available data from the city's Board of Water Supply, plus state and federal agencies. After review of these data, the panel will report—probably next November—its findings and recommendations on where New York should turn for future water supply. The Board of Water Supply traditionally favors pure upland sources, dislikes the thought of using Hudson River water extensively before its pollution is corrected. Politically influential New Yorkers feel the Hudson can solve present as well as long-range water supply problems.

Chicago River tunnel springs a leak

Crews of the Chicago city bridge department last week plugged a leak in a tunnel 45 ft below the level of the Chicago River at the Van Buren St. bridge. The 6x7 ft tunnel is used for carrying freight under Chicago's business district, and is part of a 57-mile underground system.

Preliminary investigation indicated that the leak may have been caused when city crews pulled up some old piling around the bridge abutments on the east bank, preparatory to installation of steel sheeting around the bridge structure foundation.

Water poured into the tunnel through a 5-in hole, and four pumps broke down trying to stem the flood. After flood doors at either end of the tunnel were closed, the bridge was raised for five hours, and about 250 yards of clay were dredged from the center of the river and dumped over the tunnel to plug the hole.



EASY WAY TO TUNNEL—Workmen are erecting forms for part of the 1.5 mi of tunnel-like galleries which will extend through Hungry Horse Dam, in western Montana. Forms are set up on one of the foundation blocks before additional concrete is poured. Galleries will be used for inspection and grouting and will provide drainage. In the left background are sections of two 13.5 ft penstocks to serve two of the four hydraulic turbines which will be installed. (Reclamation Photo)

School building program starts in Pennsylvania

The Pennsylvania State Public Building Authority has set dates for its first construction bids touching off the brick and mortar phase of a statewide building project for local school districts. (ENR Mar. 16, p. 36).

Bids on two major school improvements will be opened by the PSBA soon. One of the first projects involves alterations and a new addition to the elementary school building at Scotland, Franklin County. The other is an addition to the Belle Vernon junior high school building in Fayette County.

Buildings for distressed school districts will be constructed by the agency and rented to local school boards until paid for by rent money.

The authority cleared the way for actual school building activities after nearly three years of litigation to establish a clear legal set-up, aided by 1949 legislative revisions to the original agency set up by the assembly in 1947.

So far the agency has received hundreds of requests for new construction work running upwards of $300,000,000. While there is no legal limit on the extent of the authority's activities, its current building program is being geared to a $25,000,000 term bond issue at 3 percent interest from the State Public School Employees' Retirement Fund.

Oregon paper companies given orders on pollution

Culminating 10 years of study on stream pollution by paper mills, the Oregon State Sanitary Authority has issued formal orders to four paper manufacturing companies to cease dumping waste materials into the Willamette and South Santiam rivers during July, August, September and October, or at any other time the rivers falls below specified minimums.

The order, effective May 1, 1952, applies to mills of the Oregon Pulp and Paper Co. at Salem, Spalding Pulp and Paper Co. at Newberg, Crown Zellerbach Corp. at West Linn and Lebanon, and Publishers Paper Co. at Oregon City. For the Lebanon mill, situated on the South Santiam, the minimum flow will be 500 cfs. For the other mills, all located on the Willamette, the minimum will be 7,000 cfs.

Findings by the authority charged that 84% of pollution in the Willamette River, exclusive of that received from tributary streams and the city of Portland, comes from paper mills. These wastes, the findings charge, are sufficient to deplete the dissolved oxygen content of the river at low water periods to such an extent that fish life cannot survive.

Original orders directed that pollution cease by Dec. 31, 1951, but the deadline was extended.

NCA hits proposals to split contracts

Industrial builders group announces resistance to state legislation which would divorce specialty contracts

Resistance against legislation which would require the submission of separate bids to property owners on contracts for electrical, piping and similar specialty work has been pledged by the National Constructors Assn.

The group found such efforts going forward in state legislatures, "particularly in the Gulf Coast area." NCA's position is based on a resolution passed by its executive committee last week. NCA is composed of 20 contracting firms building oil refineries, steel mills and chemical plants.

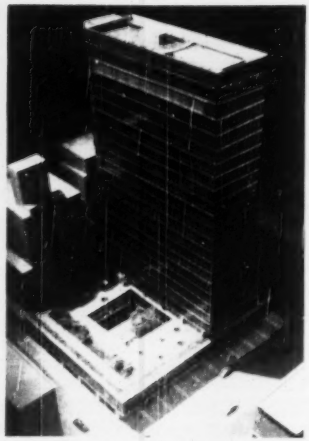
Such legislation, the NCA resolution said, "would impose artificial barriers to free competition in the construction industry," and "it added that it "is therefore contrary to the public interest."

• **Louisiana legislation**—Specifically, NCA mentioned a bill now in the Louisiana legislature which would require that electrical construction contracts in excess of $10,000 be divorced entirely from the general contract. The measure has the support of the National Electrical Contractors Association, NCA said, and a similar bill is being supported by groups in the plumbing industry.

In Texas, the Associated Plumbing Contractors of Houston and Harrison County, Inc., NCA said, is attempting to install a similar program. NCA said a letter had been circulated to architects, engineers and building owners there pledging not to seek legislation if the plan is adopted voluntarily.

Separating these functions from the overall function of the general contractor, declared NCA President J. E. Pitchford, "is totally unfeasible. It would result in making the owner responsible for coordinating all field work, a job which always has been and rightly is the responsibility of the general contractor. Any change would produce nothing except a waste of time, money and efficiency."

Pitchford said most contractors award sizeable subcontracts to local electrical and piping contractors when it is in the owner's interest to do so. This applies particularly to commercial building projects, he added. But he said the complexity of modern industrial plants requires a degree of coordination which is not easily achieved with outside supplies of service. Equipment such as an integral part of these jobs is sent on that most time-pressed item is the check to responsible for its proper functioning.



NEW OFFICE BUILDING—Lever House, new headquarters for the Lever Brothers Co., in New York City, will be started in June. It will rise 21 stories, finished outside in heat absorbing glass and stainless steel. Host plaza in the foreground is the second floor roof. It will open off an employee restaurant and recreation room. Skidmore, Owings and Merrill are architects. Weskopt & Pecksworth are consulting engineers.

Master plan to control landslide threats

Following a study of a hillside slide at Astoria, Ore. (ENR May 4, p. 27) which affected 25 homes, 15 of which were moved to safety, Oregon State Geologist Ewart Scott proposed a master plan for control of future slide threats.

He reported that to be reasonably certain of preventing slides on other hillside areas, deep substratum drainage trenches be provided and he recommended a detailed geological investigation to determine the best way to drain the surface and near surface water.

In explaining the movement of earth Scott said the water-soaking had been a gradual process over a period of many years. Heavy rains and snow in January caused small earth movements, he said, decreasing the basal resistance. The slide mass, he reported, was a thoroughly mixed unstratified porous surface mantle composed of soil, rocks, fossil boulders and broken slide, sliding on hard gravel slide at a depth of 35 ft below the surface.

Dire April 1948, earthquake could not contribute directly to the slide, Scott said, but possibly hastened the slide movement by disturbing water bearing channels in the mass movement.

Scott said most of the north slope of the Astoria valley is a well-populated district and part of that area

Form national committee on industrial wastes

Representatives of 22 of the leading U. S. industries concerned with solving difficult industrial waste disposal problems affecting the quality of water resources recently had a 2-day conference with the Public Health Service in Washington, D. C.

This resulted in the creation of a national technical task committee on industrial wastes, which has set itself these tasks:

To assemble a source list of existing processes and practices in using, treating, and controlling industrial wastes.

To make a tabulation of research projects concerned with the use, treatment, and disposal of wastes.

To define problems that confront a given industrial group for which there is no satisfactory solution, particularly those common to more than one industry.

Officers of the committee are: Chairman, Lyman Cox, waste disposal consultant, E. I. du Pont de Nemours and Co., Inc., Wilmington, Del., and chairman of the Water Pollution Abatement Committee of the Manufacturing Chemists Association; vice-chairman, Harry Gehm, technical director, National Council on Stream Improvement of the Pulp, Paper and Paperboard Industries, Inc., New York; secretary, Louis L. Warrick, Technical Services Branch, Division of Water Pollution Control, Public Health Service, Federal Security Agency.

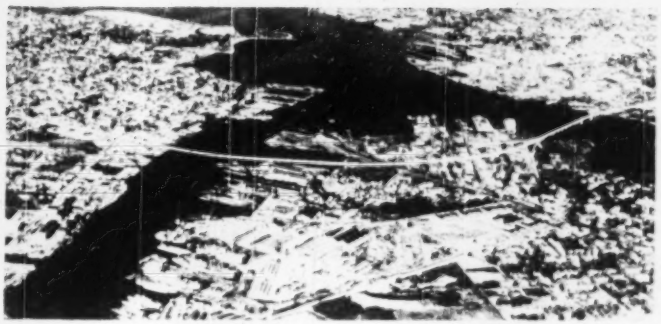
The next meeting of the committee will be in October at Cincinnati, Ohio, in order to become acquainted with the activities of the Environmental Health Center there.

Plans nearly ready for huge Rio Grande Dam

The International Boundary and Water Commission at Laredo, Tex., said last week that plans for the $46,000,000 Falcon Dam on the Rio Grande will be ready by the end of this month or early in June.

Calls for bids on the main dam contract will be issued a month or six weeks after plans and specifications are released. Officials said that the Mexican section of the IBWC headquarters at Juarez is about halfway through translating the plans and specifications into Spanish.

Other bids have been asked recently on six 15,000-hp hydraulic turbines for the dam's two hydroelectric plants, and for electrical controls and water distribution stations at Falcon's Village construction headquarters at the dam site.



BRIDGE, TUNNEL REPLACE FERRY—This aerial photograph, looking north, shows the route of the Elizabeth River bridge-tunnel project to connect Portsmouth and Norfolk via Berkley. Portsmouth, at the left, will be tied to Berkley by tunnel. Berkley, center, will be tied to Norfolk by bridge.

Bridge, tunnel work in high gear

Topped by start of work on a combination bridge and tunnel at Norfolk-Portsmouth, Va., work on river crossings along the East Coast and in the Middle West took a top spot in engineering news last week.

Developments, in addition to the Norfolk-Portsmouth work, included the prediction that substructure work on the Delaware Memorial Bridge near Wilmington will be completed ahead of schedule; further moves on the construction of a toll bridge across the Mississippi River near St. Louis; plans for a bridge across the Christena River near Wilmington, Del.; the releasing of plans for the Yorktown approach to the York River bridge in Virginia; and start of concreting work for the Chesapeake Bay Bridge at Baltimore.

• **Start Norfolk work**—Construction of the $25,000,000 bridge-tunnel project to provide a continuous highway crossing of the Elizabeth River between Norfolk and Portsmouth was started recently. Completion date is set for March, 1952.

The 12-mile improvement will cut travel time between the two cities in the Hampton Roads area to less than four minutes, eliminating present ferry trips. An old bridge, connecting the city of Norfolk with the town of Berkley, will be removed when the project is completed.

The tunnel section, to measure 5,330 ft from portal to portal, will extend under the ship channel for a distance of 2,100 ft. The four-lane bridge will span the east branch of the Elizabeth River between Berkley and Norfolk, and will measure 2,135 ft from abutment to abutment. The bridge will include a 179-ft double-leaf bascule span across the navigation channel.

The Elizabeth River Tunnel Commission (created in 1942) recently awarded the tunnel contract to Merritt-Chapman and Scott Corporation, of New York, and the Tidewater Construction Co. of Norfolk. Tidewater will build the bridge. The two companies acted as joint contractors on a total award of $16,233,642. Consulting engineers are Parsons, Brinckerhoff, Hall and Macdonald of New York, and the J. E. Greiner Co. of Baltimore.

Merritt-Chapman & Scott said last week that it had awarded a subcontract for fabrication of the seven sections of double-shelled steel casing to be used for the underwater section of the tunnel to the Bethlehem Sparrows Point Shipyard, Inc. of Sparrows Point, Md. Each of the seven sections of tunnel casing will be about 700 ft long and 31 ft 4 in. in inner diameter.

• **Other work**—Plans for the Yorktown approach to the multi-million dollar George P. Coleman Memorial Bridge across the York River were announced by the Virginia State Highways Department. The department said that all right-of-way for the approach road has been cleared, following an agreement with the National Park Service.

The approach will intersect Yorktown's Main Street at grade after a special intersection has been constructed to channelize and control traffic. South of Main Street an earth fill will carry the approach road across a ravine and the road will continue southward in an easy semi-circle through the Colonial National Historical Park, joining U. S. Highway 17 about 3 miles from the bridge end. On the Gloucester side of the river, the approach road will be about one mile in length, closely paralleling the present road to the existing ferry landing. Both approaches will be concrete highways, 22 ft in width, with the roadway graded to a width from 38 to 42 ft.

In Jefferson City, Mo., the state highway commission listened to two opposing Illinois delegations seeking approval of plans to build a toll bridge across the Mississippi River from St. Louis to East St. Louis. Commission members emphasized they did not have the final authority to decide whether the structure should be built by the city of Cahokia or by St. Clair County, but a department spokesman said that the Missouri commission would have to approve the plans as related to highways entering the Missouri highway network.

• **Wilmington bridge planned**—At Wilmington, Del., the state chamber of commerce reviewed plans of the Wilmington city engineer's office for a bridge across the Christena River to relieve traffic conditions at existing bridges.

At Baltimore, proposed municipal loans totaling $36,000,000, are to include an overpass bridge over Colgate Creek and Hilton Street, and also at Baltimore the city chemist approved use of city water for concreting on the Chesapeake Bay Bridge.

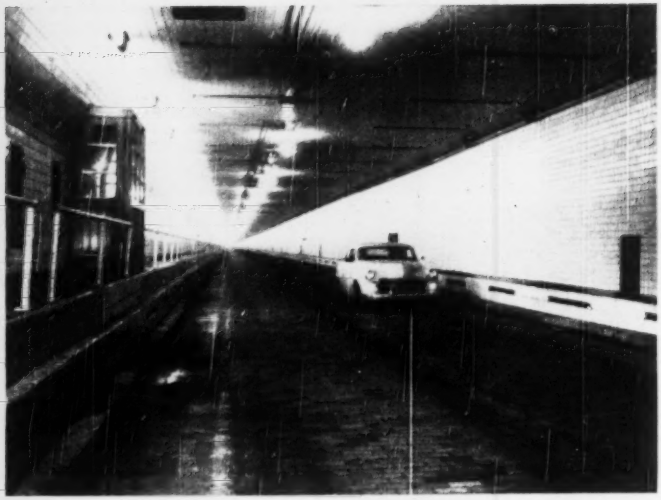
Courts favor state right to modernize highways

The California State Department of Public Works last week had two court decisions affirming its right to change and modernize the state highway system.

In the first, the State Supreme Court ruled against a group of property owners who had sought to enjoin the relocation of a portion of State Highway 3; in the other a district court of appeals ruled that construction of a concrete island or dividing strip is a police power regulation for the safety of traffic and does not constitute damage to abutting property.

Testing the relocation, the property owners group had claimed that the California Highway Commission could not change roads which had been constructed under a 1909 law that provided for highways "permanent in character" to be "permanently maintained and controlled by the state". The supreme court affirmed the lower court's denial of the injunction, declaring there was "ample statutory authority" for the highway commission to relocate and modernize any part of the system.

In the second case, a center dividing strip was built on US 99 which prevented left hand turns and crossing to the other side of the road except at certain locations. The owner of a service station had asked compensation.



DREAM COME TRUE—New York City's Brooklyn-Battery tunnel received its first paying car immediately after the dead-heading dedication parade had passed through, May 25. Longest vehicular tunnel in the U. S. at 9,117 ft, its $80,000,000 cost will be amortized by 35 cent tolls on autos and up to $1.25 on trucks. (Wide World Photo)

New York dedicates its new tunnel this week

Brooklyn-Battery Tunnel ready for use 14 years after first plans were presented —Longest of its kind in U. S.

Fourteen years and one world war after tentative plans were first submitted, New York City got its fourth vehicular tunnel connecting Manhattan with other parts of the metropolitan area. It's the Brooklyn-Battery Tunnel.

Dedication ceremonies May 25 culminated a project which has been beset with delays. A PWA grant was denied (ENR Sept. 22, 1938, p. 42); a year was lost in a controversy with the War Department over a $44,000,000 suspension bridge (ENR Jan. 11, 1940, p. 11); there was a three-year shutdown because of the war (ENR March 3, 1942, p. 367); and sandhogs went on strike (ENR Nov. 13, 1947, p. 63).

• **Longest vehicular tunnel.** At 9,117 ft, it's the longest vehicular tunnel in the United States. But, principally with the Brooklyn Bridge operating at half capacity with motorists required to pay tolls, it's the shortest way from Manhattan to Brooklyn with its 51 minutes of driving time. It will link expressway systems of both boroughs so that it should speed driving through the city. The tunnel has an estimated hourly capacity of 2,800 vehicles in each of two tubes. It cost the Triborough Bridge and Tunnel Authority $80,000,000, to be repaid from tolls.

Its design, with two cast-iron, concrete-lined tubes, is similar to that of the Queens-Midtown Tunnel. Each tube has a 21-ft, two-lane roadway. Ventilating equipment is located at each end and in the middle. The latter is possible by means of a mid-stream airshaft, built by the Groves Construction Co.* This required an open caisson sunk to rock level through an artificial island. Bracing for shaft rock excavation below this level was installed by an exacting top-to-bottom procedure which involved hanging top elements from the caisson (ENR July 28, 1949, p. 42).

The tunnel was shield-driven in mixed ground. Practices included lowering the water table at the construction shafts (Brooklyn end) by a radial, horizontal dewatering system (ENR April 20, 1944, p. 94; June 12, 1947, p. 96). Mason & Hanger Co., Inc., was contractor for the tunnel, from Manhattan; George H. Flinn Corp. for the tunnel from Brooklyn.

To achieve the permanent financing, the authority sold $44.5 million in bonds. Madigan-Hyland and Coverdale and Colpitts, consultants, estimate that the combined revenues of the tunnel and other TBTA projects will enable the authority to retire the new bonds by mid-1965 (ENR May 12, 1949, p. 11).

• **Third Lincoln tube proposed.** In the meantime, the Port of New York Authority has announced plans for an early $120,000,000 engineering study of a new 2-lane tube at the Lincoln Tunnel under the Hudson River to augment the two existing tubes and to facilitate the movement of traffic.

The plans provide for a direct connection by an elevated ramp with the authority's new bus terminal, three blocks east of the Manhattan plaza of the tunnel, and later with a cross-Manhattan expressway.

Urban, regional planning discussed at A.I.A. meeting

Urban and regional planning took top place in the meetings of the American Institute of Architects at its 82nd annual convention in Washington last week. More than 2,000 architectural practitioners attending the convention had opportunity at six sessions during the 4-day convention to hear discussions of regional and urban planning in the United States and foreign lands as it affects cities, towns and the national capital. One of these sessions examined the effects of climate in planning.

Similar symposiums explored two other subjects. Continuing the discussion of a perennial problem reported at previous conventions, three sessions brought out new thinking on light and illumination.

One major session was devoted to the third subject—accounting for architects. A demonstration lecture laid out for the architects correct procedures for the institute's standard office accounting system.

During the convention, the AIA committees on fees and contract documents corrected a general erroneous belief of the members that the institute had approved the Public Housing Administration contract forms for architect services. "The AIA," the committee said, "has not yet approved any architects' contracts covered by PHA or any other housing agency although negotiations are going forward between PHA and AIA towards an agreed upon contract."

Several months ago AIA approved a compromise PHA fee schedule for architects' services on local low-rent housing projects, but this approval does not cover the administration's contract forms.

The full slate of AIA officers was re-elected. Only one position—that of treasurer—was contested, and the incumbent won the election. Ralph Walker, New York, remains as president for 1950. The other officers re-elected are first vice-president, Glenn Stanton, Portland, Ore.; second vice-president, Kenneth E. Wischmeyer, St. Louis; secretary, Clair W. Ditchy, Detroit; treasurer, Charles F. Colean, Cincinnati.

CONSTRUCTION BUSINESS

Contract volume is lower than it looks

Contractors are taking on more dollars' worth of construction business this year than ever before in history.

But if you allow for today's inflated dollar you find that current construction volume is about normal. By adjusting dollar volume for increased construction costs, the ENR Construction Volume Index shows physical volume of construction.

And physical volume of construction going under contract today is very little more than in the 1920's. For example, this year's rate averages 362 in the volume index. This compares with the prewar high of 317 in 1929. Both are based on 100 in 1913.

• **Overbuilding?**—A straight comparison of volume figures still might indicate a mild boom. But that possibility fades when you consider the nation's recent population growth.

We're running behind where we were in the 1920's.

In the four postwar years 1946-49, physical volume of construction as measured by the index averaged 255, 3% higher than in the four pre-crash years 1925-28. But population of the U. S. in the late 1940's was 23% above the late 1920's.

So far in 1950 the index is 14% higher than in '29. But results of the current census are expected to show there are now 25%—more people in the country than there were in 1929. And each person alive today needs at least as much highway, power, shelter and production as did the man of 1929.

Yet physical volume of construction contracted per capita since 1945 has averaged 7% lower than in the 1922-32 period and 30% lower than in the 1927-29 boom.

Lumber demand still tops production

Lumber mills continue to get more new orders than they can fill, according to the National Lumber Trade Barometer. In the week ended May 6, new orders were 8% above current production, even though output was up 7% from a year ago.

• **Fir demand way up**—Douglas fir orders are still coming in faster than the mills can produce. New orders the first week in May were 7% above production. Yet production is now 13% higher than a year ago and 24% above the average to date this year.

Backlog of unfilled orders for western pine is now equal to 25 days' production at the current rate, compared with a 19-day backlog a year ago.

• **Oak flooring**—Mills producing oak flooring are also still behind on orders. In the week ended May 6, new orders for 20.7 million board feet were 6% above the week's production of 19.5 million feet. To date this year, orders have averaged 19% above production. But current output is 11% over the average production of the first four months and 27% higher than a year ago. Unfilled orders are greater than mill stocks on hand by 25%; last year at this time, unfilled orders were 5% greater than stocks.

Steel firm, copper, zinc, lead prices up

• **Steel steady**—In spite of rising scrap prices, fabricators do not anticipate any changes in price for plates, shapes and bars. Until the recent surge in overall steel demand, suppliers were worried about declines, not increases on fabricated steel. Although steel production is humming at 100% capacity, much of the demand is backlog built up during strikes.

• **Copper demand strong**—Despite widespread talk of even higher prices on copper, observers think the metal may hold at 20¢ cents.

Demand for June delivery is most active. Supplies are not adequate to make all delivery dates in the second quarter.

• **Zinc sellers' dilemma**—With zinc now at 12 cents a pound, St. Louis sellers are worried about competition from aluminum; galvanized sheets and aluminum sheets have had it nip and tuck since the war, fighting for roofing, siding and other materials. Zinc consumers feel the recent price advances have gone far enough—2¢ cents or 25% since mid-March. But if the present price of 12 cents doesn't bring more production from the mines, sellers feel they will have to yield to the terrific demand pressure and raise the price some more.

• **Lead smelters raise price**—Active lead demand brought three price jumps. It's now 12 cents a pound, compared with 10½ cents in March.

Certain smelters have been holding back stocks accumulated as the price declined from 12 cents the latter part of 1949 to 10½ cents this spring.

This month consumers were in the market for big tonnages of lead. The price climbed ¼ cent on May 4, ¼ cent May 10, and ½ cent May 11.

Laborer-carpenter guns blaze again in St. Louis

Last Saturday, four shots were fired into the home of Erwin Meinert, secretary-treasurer of the Carpenters District Council in St. Louis.

Meinert told police, "the shooting was undoubtedly due to our jurisdictional dispute with the building laborers' union." A gunbattle between members of the two unions rocked St. Louis labor relations just last month.

A short time after Saturday's shooting, police arrested Paul Hulahan, business agent of the Laborers' Local 42, and Anthony Pelker, also a business agent for the same local. Both told police they had been at Mrs. Hulahan's tavern at the time of the shooting.

State and local bond approvals up sharply

States and municipalities approved $86,813,000 of tax-exempt bond issues during April—55% more than a year ago, according to THE BOND BUYER.

Among the more important construction bonds approved are: Albuquerque, N. M. $5.7 million for water, sewer and general improvement; Buncombe Co., N. C. $5.5 million in school bonds; Wake Co., N. C. $4.5 million for a school and tuberculosis hospital.

• **Bonds defeated**—During April, 50 municipalities defeated $42.6 million of bonds, compared with $44.5 million defeated a year ago.

Baltimore brick shortage

Baltimore's brick shortage is now acute. Local manufacturers have no stocks and are quoting 3 to 4 weeks' delivery for mail batches.

Local manufacturers of concrete and cinder block are sold out for the season. These materials must be hauled from York, Pa., and some builders are considering bringing them from northeast Maryland.

Paving awards gain 38%

A surge in airport paving awards last month helped raise total concrete paving awards 38% higher than a year ago. But the 5,032,261 sq yd of April awards were 65% below March.

Road paving awards were 2,126,136 yd, up 31% from a year ago; street and alleys 2,481,341 yd, up 26%; and airports 424,784 yd, up 703%.

Total 1950 awards are now 51% ahead of 1949—16,120,370 sq yd the first four months. Roads are 33% above last year, streets and alleys 69%, and airports 360%.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 56, went to press.)

Lookout Point Dam—Morrison-Knudsen Co., Inc., Boise, Idaho; Peter Kiewit Sons' Co., Omaha, Neb.; and Macco Corp., Paramount, Calif., have been awarded $18,676,051 joint contract by the U.S. Engineers, Portland, Ore., to complete earth embankment dam structure and construct spillway structure for Lookout Point Dam, Lane County, Ore.

Steam Generating Plant—Consolidated Edison Co. of New York plans $257,000,000 construction program during next four years, to include world's largest steam-generating plant to be erected at Astoria, N. Y., with 160,000 kilowatt initial capacity. Ultimate capacity will be 1,000,000 kilowatts.

Residences—Sandee Builders, Inc., Phila., Pa. will construct residential development in Chester, Pa. to cost $8,000,000. Work will be done with owners' forces. Edwards & Green, Camden, N. J. are architects; Chester T. Baker, Chester, Pa., is engineer.

College Expansion—Yale University, New Haven, Conn., Plans $25,000,000 long-range construction program. Larger structures would include Anthropology and Archeology Center, $5,000,000; Administration building, $1,200,000; Chemical Engineering building, $2,925,000; Durham Electrical Engineering building addition, $1,000,000; Geology Department building $1,000,000 and housing for students in professional schools, $5,000,000.

Bond Election—City of Dallas, Tex., will vote June 20 to issue bonds for construction. Among the projects to be voted on is $14,700,000 for improving water supply, $7,500,000 for sewers, $4,000,000 for improving streets, $1,500,000 for public market and $1,300,000 for garage. J. E. Conway is public works engineer and Marvin B. Springer is city planning engineer.

Housing—Kahn Sommers Assoc., Inc., Detroit, Mich., was low bidder at $3,520,000 for construction first unit of Edward J. Jeffries Housing Project in Detroit, Mich., when bids were opened by the Detroit Housing Commission, Detroit, Mich. Smith Hinchman & Grylls, Inc., Detroit is architect.

Rolling Mill—Continental Steel Co., Kokomo, Ind., will take bids in about thirty days for constructing continuous rolling mill and other improvements at steel plant, Kokomo. Estimated cost is about $5,000,000.

Generators—The Westinghouse Electric Corp., Seattle, Wash. was awarded contract at $4,277,100 for four generators for Chief Joseph Dam, near Bridgeport, Wash., by the U.S. Engineers, Seattle, Wash.

Residences—Park View Manor Development, Wilmington, Del. will construct residential development and shopping center in Wilmington by own forces. Estimated cost of project is $7,000,000.

Plant—Fairbanks, Morse & Co., Chicago, Ill. plans constructing scale plant at Turner, a suburb of Kansas City, Kan., to cost about $3,000,000.

Housing—Fred B. Wilson, Atlanta, Ga. plans constructing housing in Atlanta to cost about $6,000,000. James C. Wise, Atlanta, Ga., is architect.

Hospital—Robert E. McKee, Los Angeles, Calif. was low bidder at $3,007,700 for constructing addition to U.S. Marine Hospital, San Francisco, Calif., at the Public Buildings Administration, General Services Administration, Washington, D. C., letting May 16. Douglas D. Stone and L. B. Mulloy, San Francisco, are architects.

Pipe Line—Bureau of Reclamation, Denver, Colo. awarded contract for pipe line Cachuma Project, section of Santa Barbara Project, California, to American Pipe & Construction Co., Los Angeles, Calif., $1,382,886.

Air Turbine Laboratory—Bureau of Yards & Docks, Navy Department, Washington, D. C. will take bids June 7 for constructing exhaust wings 1 and 2 for Air Turbine Laboratory at Trenton, N. J. Estimated cost is $3,000,000. Frank Grad & Son, Newark, N. J. are architects.

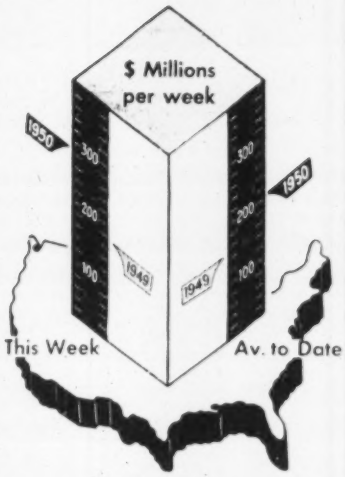
Courthouse—Fulton County, Atlanta, Ga. received low bid from Christian & Bell Co., Atlanta, Ga. at $2,293,000 for constructing courthouse annex. Burdi & Humphreys and W. J. Creighton, Atlanta, are architects.

Wind Tunnel—U.S. Engineers, Washington, D. C. received low bid for wind tunnel laboratory and foundations at Langley Field, Va. from Eichleay Engineering Corp., Pittsburgh, Pa. and Newport News Shipbuilding & Drydock Co., Newport News, Va. at $2,540,000.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base = 100	1915	1926
Construction Cost ..... May 18	490.55	258.69
Building Cost ..... May 18	584.27	296.91
Volume ..... Apr. 29	587	174



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	Week of May 25 1950	Cumulative 1950 thru wk 21	Cumulative 1949 thru wk 21	% change
Federal	$62.8	$609.3	$427.9	+49
State & Muni.	63.1	1,229.2	1,134.1	+13
Total Public	$125.9	$1,838.5	$1,562.0	+20
Total Private	158.3	2,586.7	2,147.8	+20
U. S. Total	$284.2	$4,425.2	$3,709.8	+19

Contracts by type of work

	This Week	Cumulative 1950 thru wk 21	Cumulative 1949 thru wk 21	% change
Waterworks	$3.6	$95.2	$62.1	+53
Sewerage	2.1	95.2	97.9	-3
Bridges	1.9	125.4	120.0	+5
Highways	29.3	464.4	291.2	+59
Industrial Buildings	28.2	1,256.1	954.1	+32
Public Buildings	42.2	282.8	656.1	-57
Residential Buildings	97.3	478.9	383.9	+24
Commercial Buildings	58.7	1,436.2	1,312.2	+9
Unclassified	20.8	362.8	297.1	+22

NOTE: Minimum size projects for federal work: waterworks and waterfront, $100,000; sewerage, $50,000; bridges, $500,000; highways, $250,000; industrial buildings, $50,000; other public works, $25,000; residential buildings, $50,000; other building types, $25,000.

New capital for construction

	Cumulative 1950 thru wk 21	Cumulative 1949 thru wk 21	% change
Corporate Securities	$1,713.2	$1,055.2	+62
State and Municipal	89.0	147.0	-39
Private Financing	822.2	811.2	+8
Total Capital	$2,624.4	$2,013.4	+30

Air pollution conference hears 80 papers

Health hazards, economic loss, and the feasibility of corrective legislation considered

Eighty papers were presented to the President's Technical Conference on Air Pollution in Washington (ENR May 4, p 29), but the conference quit without a definite national program.

Many phases of air pollution—its dangers to health, the economic loss, the availability and cost of control equipment, the feasibility of legislation—were discussed exhaustively. The general feeling, though, was that more research is required before a program can be set up.

Attending this first government-sponsored gathering were over 700 authorities, including representatives from industry, research and education organizations, state and municipal governments. There was a scattering of delegates from Great Britain and Canada.

Chief product of the meeting was a resolution recommending that the government set up an advisory council on air pollution.

Before the vote was taken, one delegate protested that the conference had been called simply for this purpose. R. W. Coward, of Ulvish Arrester Corp., Birmingham, Ala., who described himself as a tax expert, said he saw no need for "another government bureau, more jobs and more of the taxpayers' money to study air pollution problems." When he received no support from the conference, he remarked: "They waited until all the out-of-town boys had left and only the government boys were here."

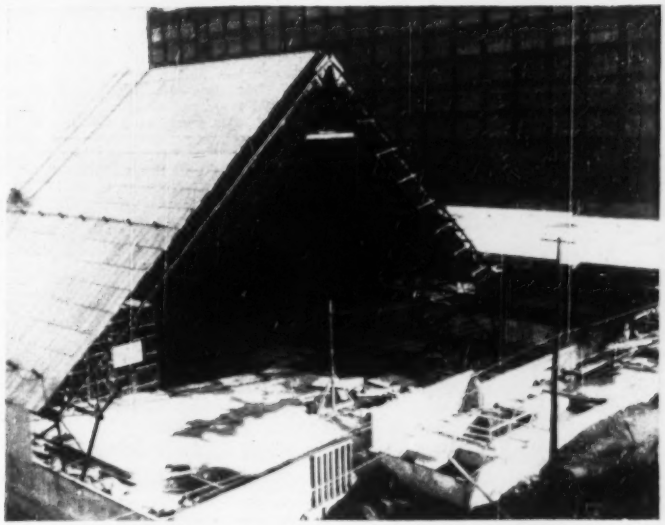
Functions of the council, as outlined by the chairman of the steering committee, Dr. William P. Yant, of the Mine Safety Appliances Co., Pittsburgh, and accepted by the conference, are the development of a program which has as its object the "solution of all air pollution problems in the most effective and expeditious manner." One of the delegates muttered that "this means we will be back again and again."

• **See $1.5 billion loss**—On the economic side, it was estimated that the loss to the country from air pollution is $1.5 billion yearly, while over $1billion a year is now being spent on control measures by government and industry.

President Truman, in his message to the conference, emphasized that while the government would take leadership in research, the control of air contaminants is a matter for each locality to study and regulate. For example, several cities in New York state spent over $5,500,000 in 1949 modernizing plants to comply with air pollution regulations, according to that state's Health Department.

Dr. Leonard A. Scheele, surgeon-general of the U. S. Public Health Service, warned against hastily-devised and ill-considered local laws. He offered to make available to any community the technical information and experience of PHS. He said there are now five bills in Congress dealing with air pollution. One would authorize USPHS to begin immediate studies on medical aspects of air pollution. None of the bills has yet had a hearing nor has any new money been appropriated for such studies. Industry men kept close watch on the part PHS plays to take in an air pollution program.

• **Equipment cost high**—High cost of installing control equipment was regarded by industry men as the big problem. It was said the equipment itself is available or will be available if needed. In a large plant, for example, it was estimated that control machinery can run as high as $200,000 to $300,000. A suggestion that was originally planned for a conference resolution but will have consideration later was that costs be amortized as a tax deduction in an of several ways.



SHAPED LIKE SUGAR—This new warehouse, under construction at Montreal, Canada, is being built for the Canada & Dominion Sugar Co. by the F. H. McGraw Co. of Canada. This design was chosen over more conventional sugar warehouse designs for several reasons. It eliminates the need for heavily reinforced walls. It cuts down on waste space because its 39-deg roof follows the angle of repose of a raw sugar pile. Construction costs are considerably lower than on other types of structures. Being 507 ft long and 120 ft wide, it will store enough sugar to feed the refinery it serves during months when transport into Montreal is tied up. It will allow the elimination of expensive handling, also.

United States Army to use vacuum concrete process

Vacuum Concrete, Inc., of Philadelphia, Pa., last week granted a general license to the United States Army for use of the vacuum concrete process. Karl P. Billner, president of Vacuum Concrete, Inc., and inventor of the process, announced the contract.

It covers royalty rates to be paid for use of the patented process in construction work by the Corps of Engineers and by any others building for the Army. It sets a sliding scale of rates lower than standard royalties.

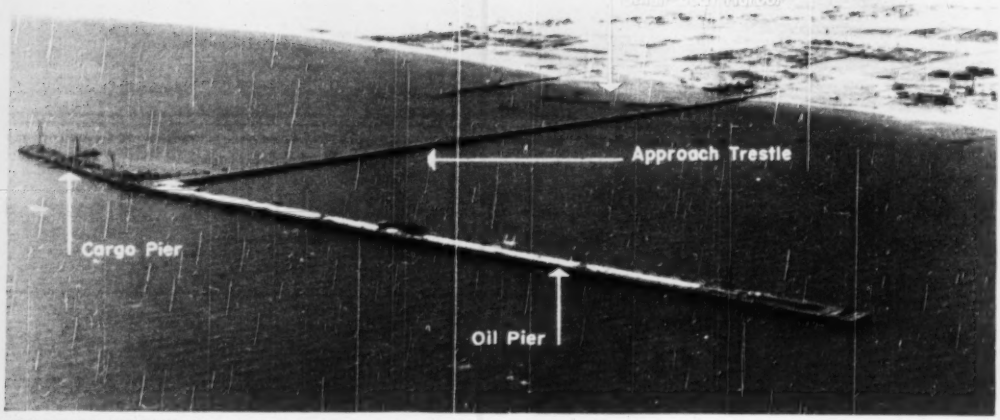
A similar contract covering work of the Bureau of Reclamation has been in effect since 1940.

Lt. Col. Bristor becomes Detroit district engineer

Lt. Col. John D. Bristor has become district engineer in Detroit for the Army Engineers. Maj. Gen. Lewis A. Pick, chief of engineers, announced.

He will succeed Col. Lunz J. Ruggles, assigned to the 1st Army.

Colonel Bristor has been district engineer, U. S. Lake Survey, with headquarters in Detroit. He will serve as acting district engineer of the U. S. Lake Survey in addition to his new duties.



OFFSHORE PIERHEAD accommodates six tankers (right) and two cargo ships (left). White lines are aluminum-painted pipes.

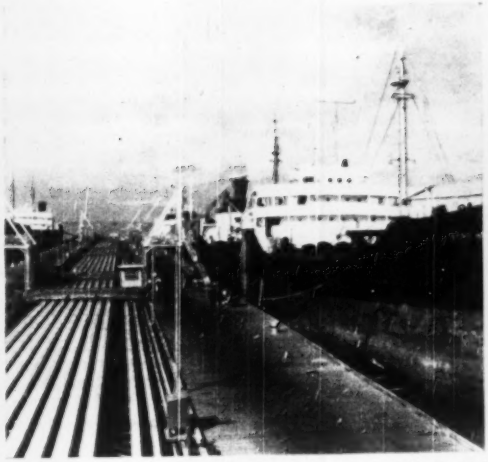
Gravity fenders ease berthing stresses throughout high Persian Gulf tide range

Huge Oil Pier Built in Open Water

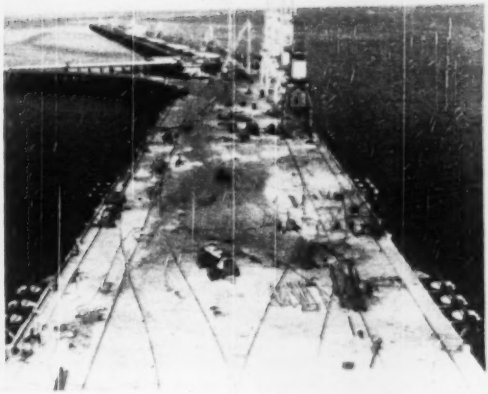
D. C. Wolfe

Vice president, Swendrup and Parcel, Inc
San Francisco, Calif.

LOCATION MAP—Oil for tankers travels from Burgan oil field, via Ahmadi to the new pier. Ahmadi is a new city of 5,000 population.



OIL PIER is 105 ft wide, 23 ft above low water. Over horizontal truss, middle 45 ft carries eight 24-in. crude-oil lines, plus lines for bunker fuel, slops, diesel fuel, sea water, fresh water and compressed air.



CARGO PIER is 100 ft wide, carries four portal cranes. Note clusters of gravity fenders. Fender horizontal reactions are distributed longitudinally by a horizontal truss along pier centerline just below deck.

after the ships are tied up during periods of rough seas, focused attention on the type of fenders required adequately to safeguard the structure and the ships at berth. The owner decided to use a type of suspended or gravity fender invented by Professor A. L. L. Baker of the Imperial College of Science, London. Professor Baker's principle first was used in "Mulberry" installations for the Normandy invasion and on the Heysham Jetty, north of Lancaster, England. Each fender consists of a group of three concrete-filled steel cylinders that are arranged to swing by links from points of suspension near top and bottom. Links are attached to a pile bent paralleling the face of the pier. Each fender group is designed to resist and cushion a load of 250 tons, by swinging inward and upward with the impact of the vessel. The fender groups are spaced at varying intervals ranging from 120 to 165 ft. The fender bents are designed to support the dead weight of the fenders only, the horizontal component of berthing impact forces being distributed to the pier as equitably as possible by means of a horizontal-plane longitudinal truss built into the center of the pier in the plane of the bent caps.

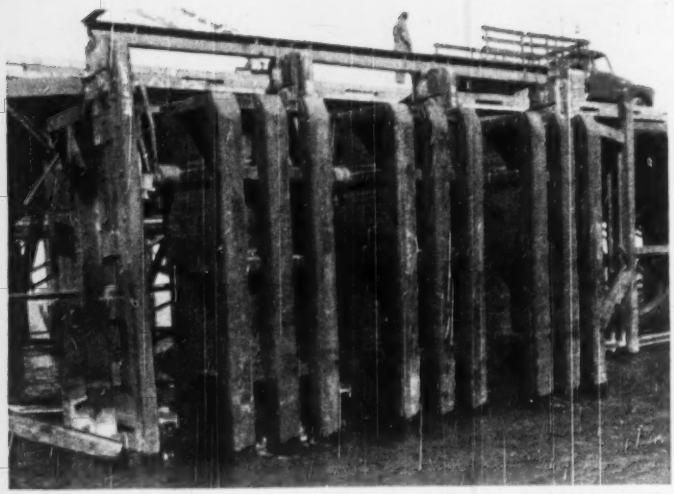
• All steel welded construction—The pier is an all-welded steel structure with a timber deck. Steel bearing piles, 4000 of them, are 24-in. H sections weighing 73 lb per ft; they average about 90 ft in length. The piles penetrated the coral stratum after about 500 blows of a single-acting air-powered hammer with a 5,000-lb ram; average penetration was 20 ft. Piles in the approach trestle were driven to sustain a load of 65 tons; those in the oil and cargo piers were driven to 35- and 50-ton bearing values, respectively. As anti-corrosion protection the steel piles and all bracing below cutoff were sand blasted and coated with hot-applied coal tar enamel before driving.

The bent spacing for the approach trestle and oil pier is fifteen feet; for the cargo pier, ten feet. The individual bent bracing consists of lighter H sections or double angle sections placed between the canopy piles and extended as near to low tide as practicable. Bolt holes in the individual pile caps matched corresponding holes in the bent cap beams as an aid to proper pile spacing; the top flanges of the bent cap beams also had holes to match holes in the stringers, so as to space the bents properly. The bent cap beam design involved many loading conditions, including the dead and live loads of the stringers, friction forces of the pipelines, bollard line pulls, berthing impact reactions and berthing friction reactions.

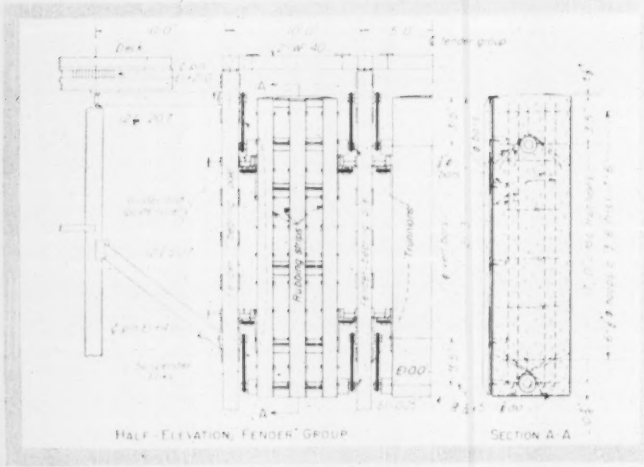
• Fender load distribution truss—Since it was considered structurally infeasible to design the fenders and their supporting structure independent of the pier, provisions were made to transmit the fender horizontal reactions to as many pier bents as possible. This was accomplished for the cargo pier by a continuous 20-ft deep horizontal-plane truss with chords equidistant from the pier center line. (On pier chord to chord dimension is 45 ft.) The chords and web members of the truss are wide-flange beam sections welded to and in the same plane as the pile bent caps. The diagonal system is so arranged that a panel point occurs opposite the centerline of each fender group. Although the principal function of the horizontal truss is to distribute berthing impact loads over a number of bents, the truss also serves to distribute friction loads resulting from oil and utility pipe movements and from line pull forces imposed on the bollards.

The heavier and stiffer the horizontal truss is made, the greater is the number of bents that will participate in resisting the load. However, the amount of energy that the pier can absorb by elastic deformation for a given reaction by a fender group varies inversely with the number of bents participating in the action. It is considered desirable and conducive to balanced design to limit the horizontal force transmitted by a fender group to 250 tons. This horizontal force is distributed through the horizontal truss to the piling. A sufficient number of bents must participate to limit the maximum pile top deflection to about 6 in., so that the piles will not be overstressed. In order to obtain the greatest possible storage of energy in the pier, it is necessary that the truss be as flexible as possible, consistent with the limiting permissible pier deflection.

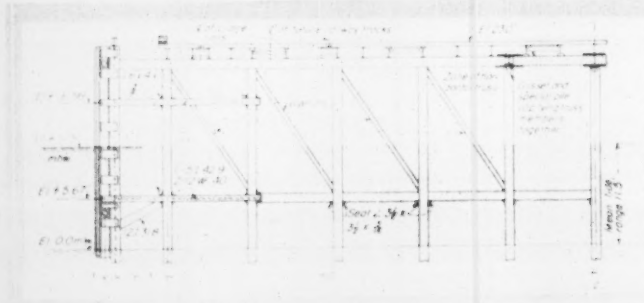
The horizontal truss was designed without any expansion joints; it therefore will expand and contract about its center. Based on a temperature



GRAVITY FENDERS complete except for guide beams and rollers. Ship impact causes fender to move backward and upward, gradually increasing horizontal resistance.



FENDER DESIGN drawing shows four-point two-level fender suspension, as well as guide beams and rollers, which prevent twisting and jamming.



BRACING SYSTEM through which berthing loads are transmitted into pier bents. Horizontal truss, for distributing stresses into other bents, lies in cross-hatched zone.

variation of 50 deg. from the mean, the pier will vary in length by about eleven inches.

• **Design of gravity fenders**—In designing the gravity fenders for the oil pier, the impact berthing load was taken to be the result of a 50,000-ton (gross load) tanker striking a fender group at 2 knot, assuming 40% of the energy to be absorbed by the fender and pier and the remainder by deformation of the ship's hull. For any desired fender group energy storage, an infinite number of combinations of fender weight, linkage radii and angular displacement are possible. However, certain physical conditions reduce the feasible selections to a narrow range. The principal limiting conditions are: (1) Weight of each cylinder should not exceed the bearing value of a pile, or 50 tons; (2) angular displacement should not exceed 70 degrees; (3) lateral movement should be kept to a minimum so that fender piles can be kept close to pier proper and travel on ships' side minimized; (4) horizontal reaction of fender group must not exceed 250 tons; and (5) length of the fenders should not be less than twenty feet, consistent with variations in tide and tanker drafts.

Guided by the above limitations, the individual fenders are concrete-filled cylindrical steel shells 6 ft dia by 21 ft 5 in. long, weighing 50 tons each. These cylinders are arranged in groups of three, at fender-foot centers. They are suspended from pairs of links near top and bottom of the cylinder and supported by a four-pile bent parallel to the longitudinal axis of the pier. For the oil pier, the bents are located 5 ft from the outer row of piles of the pier proper; the linkage radii are 4 ft 5 in. For the cargo pier, these dimensions are somewhat less.

Each cylinder is faced with 14-in. creosoted timbers. The links are diamond-shaped with a strut across the short dimension of each. They are made of anchor chain steel, and each is tested to a pull of 175 tons. Close tolerances in fabrication and erection of the various parts were required to assure that the cylinders would hang reasonably plumb from their four suspension points. Guide beams are provided to prevent twisting of the cylinders due to friction of vessels moving along the pier face, to prevent jamming between the guide beams, 12-in. dia timber rollers are provided at the fore-and-aft ends of each.

The design, construction drawings and specifications were prepared by Sverdrup & Parcel, Inc., consulting engineers, under the direction of the writer, for International Bechtel, Inc., who were the engineer-constructors for the Kuwait Oil Company, Ltd.

Surveying Levels—More Levelheaded

Thomas E. Riley
Registered Surveyor, Portland, Oregon

IN THE FIELD of differential leveling, accuracy—always a criterion of engineering—has reached the point where it would be foolish to increase further the sensitivity of the instruments. Luckily, as one engineer has recently said, the trend now is toward "making levels more levelheaded."

What he meant is that designers of levels are giving them more stability and efficiency. More stability against shock, wear and weather, more efficiency in the field, especially in fast operation and the elimination of observation mistakes.

If anything, the trend today is to reduce slightly the "laboratory" accuracy of levels. It would be a simple matter to continue increasing the accuracy of a level in the factory—only a matter of incorporating higher magnification in the telescope and a more sensitive bubble. But in the field such increases are more than nullified by diffraction, deflection, bubble creep, heat waves, and the multitude of other "outside" errors which will then plague the surveyor.

What designers are trying to do is increase the "field accuracy" of the levels. A close glance at any prewar engineer's level—excepting only the first-order geodetic level—will show no basic change from the levels of fifty years ago. But inspection of postwar models shows definite basic changes that incorporate the known advantages of the geodetic levels into the construction instruments. These changes improve the geodetic levels, and go much further with all levels in the cause of efficient surveying.

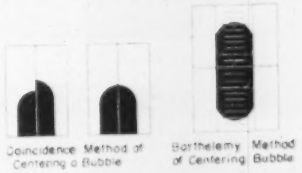
One point is that telescopic magnification definitely is not being increased, indeed, is being lowered a little in many cases because of the field troubles with high-power magnification. The telescopes are changing, however, in that they are becoming much more compact in size. The short length of such telescopes, balanced by large objective lenses, give much superior brilliance and resolving power.

Probably the greatest need in leveling efficiency has been a practical method of viewing the bubble the instant before reading the level rod, thereby decreasing the sighting error. This was done in older geodetic levels by the Barthelemy system by reading the ends of the bubble and the graduations of the bubble vial through two prisms mounted in a tube alongside the telescope. This was also done in semi-precise levels by a simple mirror that reflects the image of the level vial. Both methods were awkward and impractical, especially for cadastral and construction work. The Barthelemy prisms had to be adjusted constantly to the expanding or contracting length of the bubble, and the simple mirror was subject to gross errors of parallax. Neither method would withstand the tough abuse of ordinary leveling and each was difficult to use in wet weather or dim light.

• Coincidence bubble reading. Showing definite promise of eliminating all these complications is the so-called coincidence system of reading a level vial. Examples of this method are found in the European optical construction levels now being imported into the United States, and in at least one American tilting dumpy level. Another example is in the military level designed by the Army Engineer Board (ENR June 15, 1950, p. 120).

The coincidence system uses no marks or graduations on the level vial. Optical prisms pick up the images of both ends of the bubble, split them in half, and reflect these split images to the observer who simply adjusts the foot screws or micrometer screws until the two half images coincide. The system gives sharply defined images that can be read in any light and are impossible to misread, as can occasionally happen on the mirror markings of ordinary level vial. The prisms, of course, protect the image so that the observer views the coinciding bubble from alongside the telescope eyepiece.

The coincidence system brings two other needed improvements to level. One is that the level vial is enclosed, shielded from the sun, thus reducing the field errors of bubble creep and expansion of vial supports. The other advantage is that the general shape of the instrument can be greatly improved since coincidence reading models today are almost completely weather resistant and are fully protected from dust and abrasives.



NEW AND OLD method of viewing a bubble through prisms. New method is used on construction levels as well as geodetic levels.

• Geodetic level improvements. A new slant in geodetic levels is the coincidence-reading model that also contains an optical micrometer for extremely accurate readings without estimating. The bubble is not marked more sensitive, the rod is simply read more precisely. These levels are being used in the extensive geodetic network of the Pan American Survey that is now under progress, and one is being used for vertical control in the restoration of the White House.

The work on the White House in Washington, D. C., is a minor example of an increasingly useful application for geodetic levels. Having an optical micrometer, the new models give highly accurate single station readings as well as consistent averages over multi-station lines (the usual basis of geodetic control). Formerly they read only in metric scale, but now they are being modified to read directly to 0.001 in. and therefore are giving exact vertical control for machinery installations, measuring displacement of structures, and for precise vertical alignment of such assemblies as airplane wings and fuselages.

• Collimation adjustment easier. The new geodetic levels incorporate another "field" efficiency. In the telescope there is an extra optical glass disk that is minutely wedge shaped and which can be rectified. By revolving this disk the surveyor slightly bends the instrument's line of sight, thus easily and delicately making the adjustment for the collimation error. This method is superior to the coarse adjustment of level rod screws.

The problem of sagging and weld-stress has been largely overcome in all types of surveying instruments by the use of optical glass disks with finely etched lines. One of the latest improvements in field efficiency of levels is the etching of the stadia lines only partway across the field of view so that the observer cannot mistake one of them for the level line.

The idea of hanging a plumb bob under the level is joke to many surveyors, is not made practical for construction layout by the incorporation of compact, accurate horizontal circles inside the base of the level. There are two glass circles, so compact they in no way bother the main use of the level, which can hardly be told from the models without them.

But of all, there seems no trend to increase the cost of new models.

Soil Test Results Shown Graphically

Test procedure and chart give complete picture of the effect of changes in water content and density on the strength of a soil

W. J. Turnbull
Chief, Soils Division,
Waterways Experiment Station,
Vicksburg, Miss.

John L. McRae
Engineer, Soils Division,
Waterways Experiment Station,
Vicksburg, Miss.

DATA OBTAINED in the past five years on many different cohesive soil types have shown that the strength characteristics of compacted soils vary considerably with variation in molding water content and density.

The pronounced effect of molding water content was more or less expected on soils tested in the "as compacted" condition, but quite surprising and unexpected was the finding that the molding water content was a very material factor in the entire future behavior of the soil, even after saturation was reached.

Laboratory tests are performed on compacted soil samples in order to establish the proper combination of water content and density at which the soil should be compacted in the field and to evaluate the strength characteristics of the compacted soil. Yet, in field work, it is very difficult to control the molding water content and compacted density to any given specified values. Even with very exacting control there is always variation in water content and density in compacted soils. Therefore, it is important that the effect of these two variables be clearly recognized.

Because of the great amount of laboratory and field experimental work being performed by the Soils Division, Waterways Experiment Station, the need for a test procedure and a method of data presentation to cover the two variables mentioned above became acute as early as 1943. At the request of, and under general instructions of, the senior author, the junior author, working under the supervision of I. B. Eastis, evolved the method of test and data presentation described.

This paper presents a schedule of tests and a method of presenting test data from laboratory compacted samples which clearly shows the effect of molding water content and density on the behavior of compacted soils.

The method of presenting test data on compacted soils as given here was first developed for presenting test results from California Bearing Ratio tests during the extensive investigation of this subject performed by the Waterways Experiment Station (Waterways Experiment Station Report 1 M 213-1, The California Bearing Ratio Test as Related to the Design of Flexible Pavements for Airports, 1 July 1945).

This method also has been found to be useful in presenting triaxial shear and unconfined compression test results on compacted samples.

The effect of molding water content and density on the strength characteristics of compacted soils varies for different soil types and can be indicated best by the proposed presentation of laboratory tests. The data presented in this paper are not to be taken as indicative of the characteristics of any

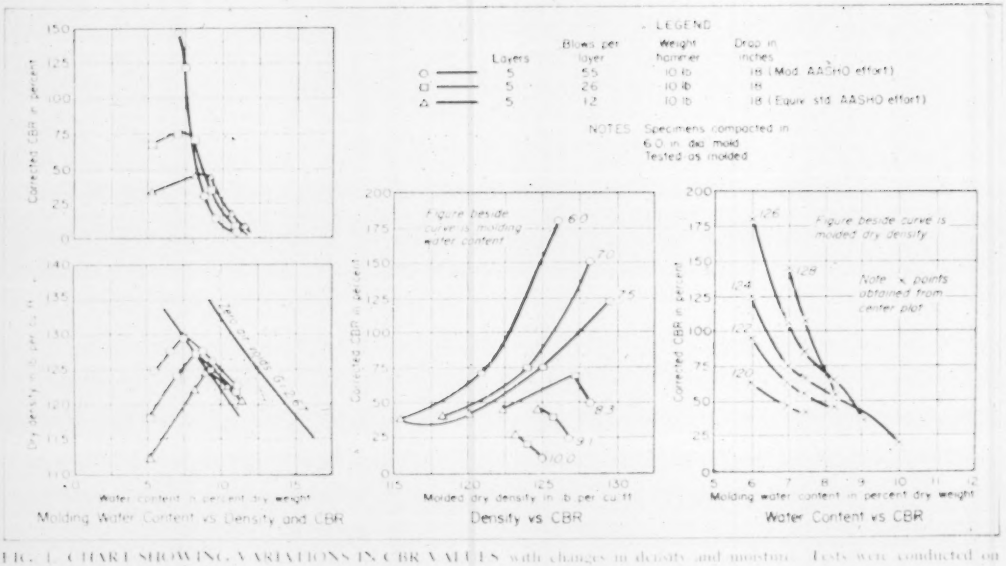

LEGEND
Layers
Blows per layer
Weight hammer
Drop in inches
5 55 10 lb 18 (Mod. AASHO effort)
5 26 10 lb 18
5 12 10 lb 18 (Equiv. std. AASHO effort)
NOTES: Specimens compacted in 6.0 in. dia. mold. Tested as molded
Corrected CBR in percent
Dry density in lb per cu ft
Water content in percent dry weight
Molding Water Content vs Density and CBR
Figure beside curve is molding water content
Molded dry density in lb per cu ft
Density vs CBR
Figure beside curve is molded dry density
Note: x points obtained from center plot
Molding water content in percent dry weight
Water Content vs CBR

FIG. 1. CHART SHOWING VARIATIONS IN CBR VALUES with changes in density and moisture. Tests were conducted on the specimens at the as-molded moisture

given soil type but are presented for illustrative purposes only.

• **Schedule of Tests**—In order to obtain a complete picture of variations in the physical behavior of compacted soils with variations in molding water content and density based on laboratory tests, the procedure followed is as given below.

(a) A practical working range of water content and density to be expected in the field is assumed.

(b) Compaction curves for three different compactive efforts are developed. The efforts used should cover the assumed working range of density and water content. Laboratory tests, such as CBR, triaxial shear or unconfined compression tests, are performed on each specimen used in the development of the compaction curves, so that the variation of the physical behavior of the compacted soil within this range can be established. The tests may be performed on samples for the "as-molded" condition or the samples may be saturated.

• **Presentation of Data**—From data obtained by the above procedure, a family of curves is developed. Fig. 1 shows such a family for CBR data.

The CBR tests were performed on specimens for the "as-molded" soil condition. The graph at the lower left shows a plot of molding water content versus dry density for the three dynamic compactive efforts used. The graph immediately above shows a plot of molding water content versus CBR for each of the specimens used in the development of the three compaction curves. The graph in the center shows a plot of density versus CBR for various constant molding water contents. This plot was obtained from the corresponding left-hand plot by taking, at a constant molding water content, the molded dry densities and the corresponding CBR value for each value of dry density. Each pair of these values gives a point on one of the curves shown in the center plot.

The graph on the right shows a plot of molding water content versus CBR for various constant molded dry densities. This plot was obtained from the center plot by taking, at a constant molded dry density, the corresponding CBR value for the different values of molding water content. Each pair of these values gives a point on one of the curves shown on the right-hand graph.

Fig. 2 shows the development of the family of curves for triaxial shear tests. The procedure for obtaining the family of curves for triaxial shear is the same as that described for the CBR test results of Fig. 1.

Fig. 1 is a representative picture of the stress characteristics at low strain (the CBR values are taken at 0.1-in. penetration), whereas Fig. 2 is a representative picture of the stress characteristics at maximum deviator stress regardless of the degree of strain.

Variations are readily demonstrated of the effect on the soil strength of different testing procedures such as consolidated undrained and unconsolidated undrained triaxial tests. Also, the variation in strength effects of taking yield, maximum, or ultimate values can be shown.

The development of the complete strength picture of a soil requires somewhat more work in testing, but it is believed that this can be offset easily by the careful selection and testing of fewer and more representative samples of soil.

As a matter of further interest, consolidation and permeability data may be plotted by this method and the range in values established in the same manner as for the strength tests.

• **Application of the Curves**—Plots of test data, as in Fig. 1 and 2, separate the two variables that have the greatest effect on the strength characteristics of compacted soils: molding water content and molded density. This permits an evaluation of the effect of molding water content and compacted density on the strength of a soil and shows whether or not it is necessary to maintain close control of water content or density or both in compacting a given soil in the field.

These plots also permit interpolation of the strength of compacted soils for any given molding water content and density within the range of values covered in the family of curves

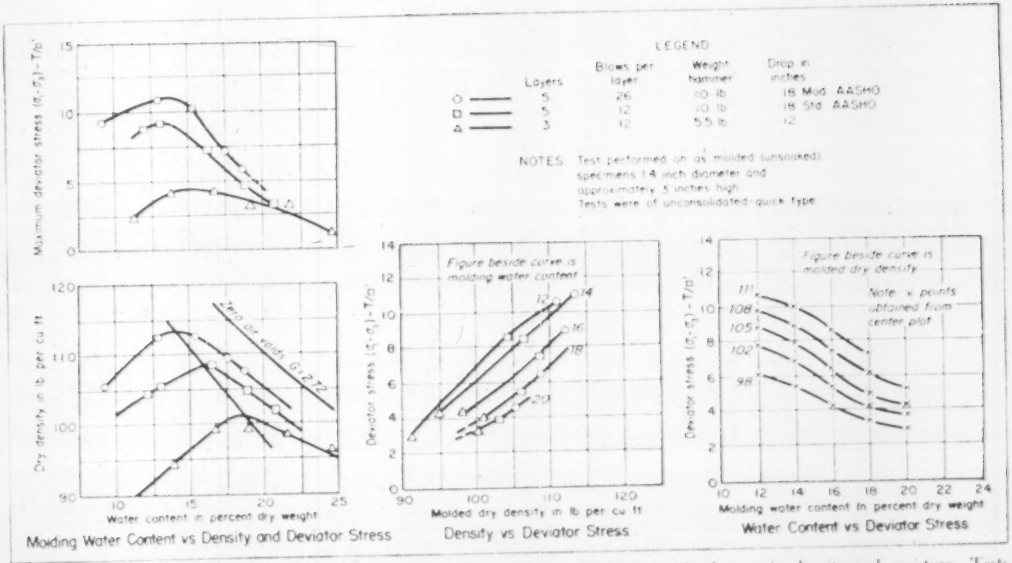
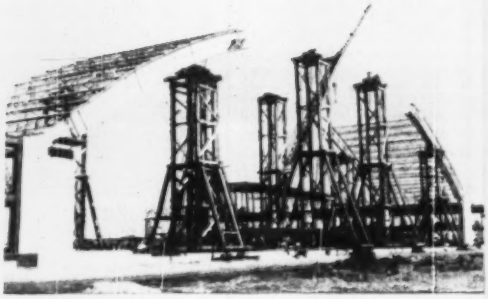

LEGEND
Layers
Blows per layer
Weight hammer
Drop in inches
5 26 10 lb 18 Mod. AASHO
5 12 10 lb 18 Std. AASHO
3 12 5.5 lb 12
NOTES: Test performed on as molded (unsoaked) specimens 14 inch diameter and approximately 5 inches high. Tests were of unconsolidated-quick type
Maximum deviator stress (σ1-σ3)-T/in²
Dry density in lb per cu ft
Water content in percent dry weight
Molding Water Content vs Density and Deviator Stress
Figure beside curve is molding water content
Deviator stress (σ1-σ3)-T/in²
Molded dry density in lb per cu ft
Density vs Deviator Stress
Figure beside curve is molded dry density
Note: x points obtained from center plot
Molding water content in percent dry weight
Water Content vs Deviator Stress

FIG. 2. CHART SHOWING VARIATIONS IN TRIAXIAL SHEAR VALUES with changes in density and moisture. Tests were conducted on specimens at the as-molded moisture.

Long Steel Arches for

1 COMBINED FOOTINGS were formed to carry columns of Icanto and hangars. Bars were set (center rear) for . . .



2 COLUMNS 15 ft wide by 25 ft high that support the steel arches. Haunch sections were erected, then . . .

A new terminal for steel-arch hangar spans has been set by the three hangars just completed at the New York International Airport. The arches span 302 ft, providing a 300-ft clear floor.

Interconnected by lean-tos on either side, the hangars form a building 1,145 ft long and 249 ft wide. The lean-tos are two-story, steel-frame structures ranging in width from 90 to 105 ft. The building was erected in 15 months despite the large spans and the necessity for installing radiant heating, sprinkler, fire alarm, and extensive lighting systems.

Each of the 300x249-ft hangars is big enough to accommodate six Douglas DC-6 transports or four double-deck Boeing Stratocruisers. In addition, parking aprons on both sides of the building can take 14 aircraft of the type having a turning circle of 175 ft, or 19 of the smaller type having a turning circle of 150 ft.

• **Design loads.** The hangars were designed for a floor live load on the roof and a 100-mph wind. The wind is determined to exert an inward pressure of 20 psf against the exterior of one's vertical side of a hangar and outward pressures ranging from 15 to 25 psf against the other side and the roof. Wind loads on the doors and on the exterior protected metal end closures are transmitted through steel bracing to the main structural arches.

• **Three-hinged arches.** The principal roof members are curved, tapered I sections, built up with plates (Fig. 7). Pinned at the supports and crown, they have a constant depth, back to back of flange angles, of 5 ft 7 in. and rise 49 ft 11 in. to provide a clear height at the center of 75 ft.

Each arch was erected in four sections by two crawler cranes, field splices being made near the quarter points of the span. The cranes operated on opposite sides of the crown. As soon as they placed a section on the four post timber props provided for temporary support, the cross framing was inserted (Fig. 2).

This framing consists principally of trussed purlins and struts spaced

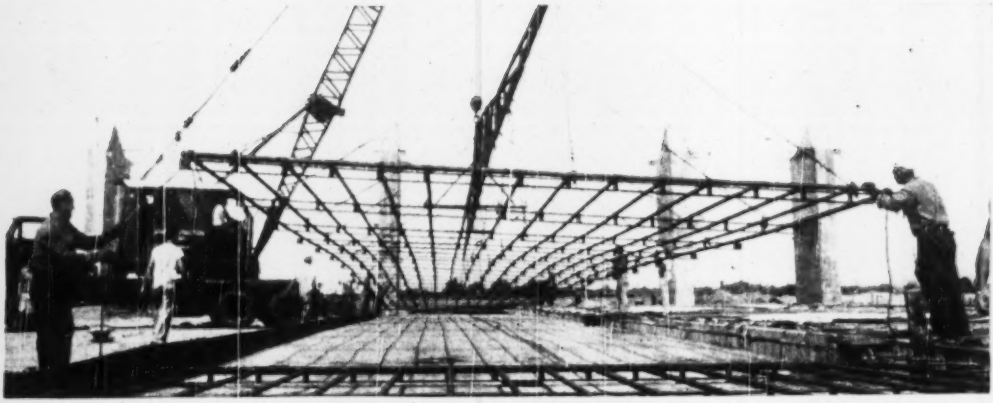
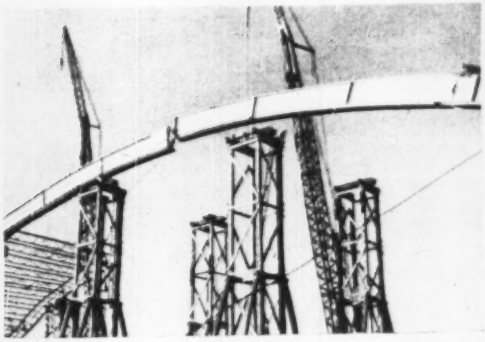
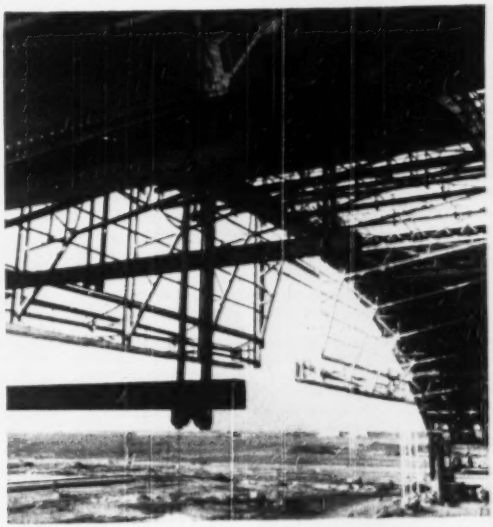


FIG. 5. RADIANT HEATING PIPING was prefabricated in 150-ft-long sections, which were placed as a unit by a crane.

Hangars Erected Fast



3 CENTER SECTIONS were spliced on and crown pin inserted. For painting and hanging pipe from roof . . .



4 RECTANGULAR FRAMES were hung from roof to support scaffolding. Planks later were placed across timbers.

about 64 ft apart, spanning 48 ft between arches. Top chords bear on the top flanges of the arches, bracing them there and also providing a smooth, curved support for the light gage steel roof deck. K-bracing is framed between the arches and the bottom chord of the struts to brace the arches at mid-depth.

The arches are supported generally on 25-ft high, 15-ft wide by 3-ft thick reinforced concrete columns (Fig. 2). Located in the outer bays of the lean-tos, these columns rest on concrete pedestals, which in turn carry the load to footings. Exterior columns of the end hangars have individual spread footings varying in depth from 3 to 10 ft, but the two sets of interior columns are supported on 5 and 10-ft deep combined spread footings (Fig. 1). The latter also carry 15x16-in. leanto columns at 24-ft intervals. Lowering of the water table for the placement of the footings was accomplished with wellpoints connected to pumps, each of which had a capacity of 2,500 gpm at a 10-ft suction lift.

Original plans for the hangars called for suspension of a vermiculite ceiling from the roof framing for fireproofing. Analysis of the breakdown of the contractor's bid, however, showed that nearly $500,000 could be saved by eliminating the ceiling hangers and equipment for ventilating the space between ceiling and roof. This saving, studies showed, more than offset the increase in insurance rate due to omission of the roof fireproofing, since the hangars are protected by sprinklers. Consequently, the contract for the hangars was revised, and the ceiling was eliminated.

• **Novel hangars carry scaffolds.** To facilitate painting the steel and hanging of sprinkler piping and electrical work from the roof framing, the contractor erected scaffolding, using hangers that he designed for the purpose (Fig. 4). He made up several rectangular frames of steel angles, each having horizontal cross pieces at top, bottom and near the top, and hung them from the bottom chords of the purlins in the bay in which he was

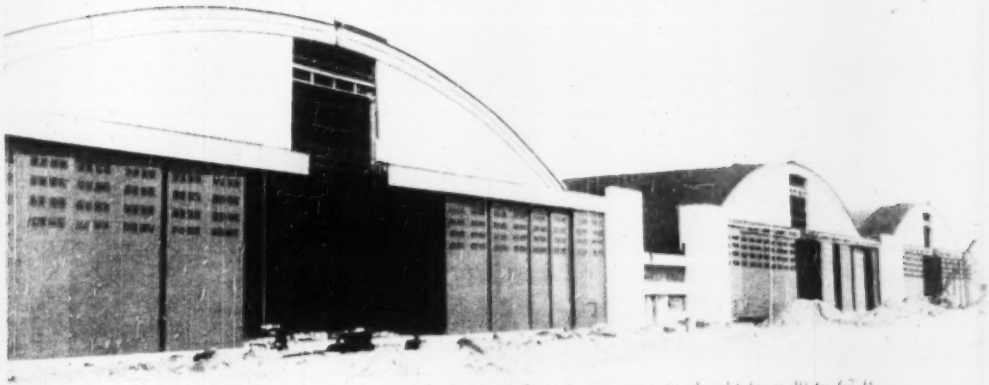


FIG. 6. STEEL HANGAR DOORS are motor-operated. Center tailgate increase opening height from 40 to 62 ft.

operating. His next step was to slip two 6x8-in. timbers through frames in the same line, resting them on the bottom and intermediate cross pieces. Then, he placed 4x6s horizontally across the timbers in adjacent rows and laid plank on top.

When he had to shift the scaffolding to the next bay, the contractor removed the plank and 4x6s. Meanwhile, he had erected what the frames hung in the new bay. There he stacked the 6x8s through these frames and relaid the 4x6s and plank, completing the move.

• **Installed equipment**—The sprinkler system for the hangars is a dry-pipe, dry-type, divided into six separate zones. It is operated by heat-sensitive devices on the under side of the roof decks, which, when subjected to rapid temperature rise, activate the sprinklers in the zone. Water is supplied through nine 10-in. and four 12-in. high-pressure, interconnected mains.

The electrical system is 3-phase, 4-wire, 4,160-v primary and 208-120-v secondary, obtained from an existing two-feeder, primary selective system on the site. Conduit was installed throughout the hangars and leantos before concrete was placed.

Lighting fixtures inside the hangars are the high-bay type that can be lowered to the floor for maintenance. Outside, floodlights are provided over each door to illuminate the aprons. Lamps are 2,000-watt and are arranged in groups having one medium concentrating and one concentrating type reflector. The lighting may be made fairly uniform in proper bearing. Also outside the hangars are photoelectric-cell controlled obstruction lights, installed on the roofs; they go on when daylight drops to 35-ft candles and switch off at 67-ft candles.

Each unobstructed, 40-ft high, 12-leaf steel door closes off the opening at each end of each hangar (Fig. 6). Sliding, nylon-bronze-protected metal pockets, the doors leave a 245x60-ft clear entrance in the open position. However, the clear height may be increased to 62 ft at the center of the hangars by raising 55x8-ft wide, turnover canopy tailgate doors. Two pilot doors and two 8x8-ft vertical lift doors also were installed to avoid frequent opening of the large doors.

• **Heating system in floor slabs**—The hangar floors, designed for a dual tandem wheel loading from taxi-ing aircraft weighing 300,000 lb, generally are 11 in. thick. They increase in thickness to 14 in. at expansion joints, of which there are two in each hangar—one longitudinal and one transverse. Dummy joints in the slab divide these areas into 24-ft squares.

Limestone screenings, which were used with good results for the airport runways, were also placed under the floors. The screenings were spread by a road grader and compacted with a 55-ton pneumatic roller.

On this dense subgrade, more than 135,000 ft of radiant heating pipe were laid, covering an area of 65,700 sq ft in each hangar. The pipe was prefabricated in sections 750 ft long and 22 ft wide and placed at a single inlet header. Fig. 5.

Compressed air lines and electrical conduit were also installed, then the concrete slab was cast, covering the radiant heating pipe 6½ in.

• **Leanto construction**—The steel frame leantos are floors and roofs of concrete made with an expanded slag aggregate. Plastic-coated waterproof plywood, cut to size with mechanical saws, served as forms.

Exterior walls of the leantos are of the cavity type. They consist of a 4-in. exterior of gray buff facing brick on 4x4x12-in. nominal modular size, a 2-in. cavity, and a 4-in. interior of concrete block. The 8-in. walls separating the leantos from the hangars are concrete block. All openings other than steel doors are protected with double-link rolling steel shutters.

The Stock Construction Co. of New York City holds a $5,518,951 contract for the construction of the three hangars. Contractors were given a choice of steel or concrete arch hangars, and this company's bid for steel construction was the lowest received. General superintendent Arthur Nugee and Al Williams are credited for the speed of the work.

John M. Kyle, Jr., is chief engineer of the Port of New York Authority, operator of the New York International Airport. Frank Wagner is engineer in charge of the job. Gustav M. Storey is general superintendent of the airport and Hugo Dowling is chief of the field engineering department. Robert & Schaefer were consulting engineers.

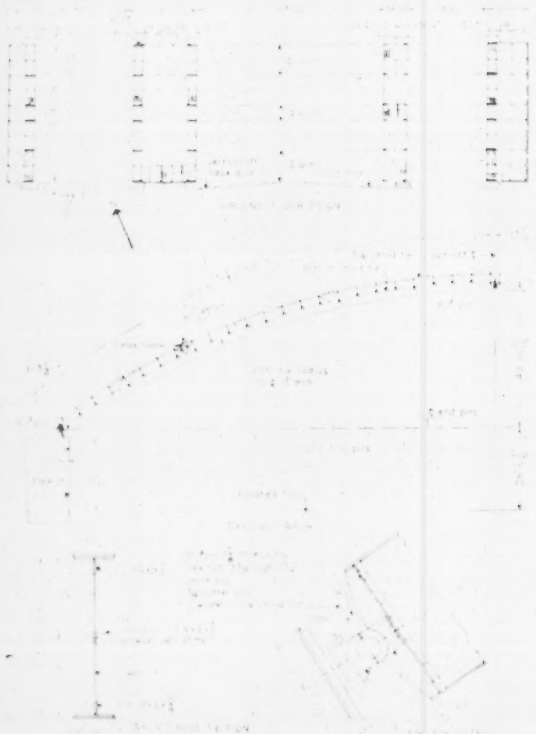


FIG. 7. THREE HANGARS, each with a 300x219-ft floor area, are interconnected by leantos. Roofs are supported on three-hinged steel arches.

Tests at the Rocky Mountain Hydraulic Laboratory indicate that—

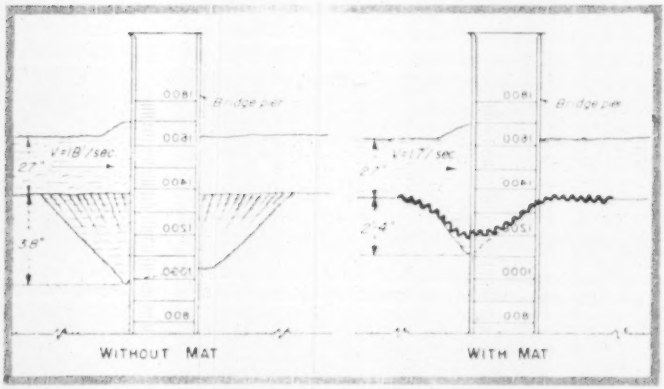
Flexible Mats May Reduce Scour At Piers of Small Bridges

David W. Appel
Instructor in Hydraulics, State University of Iowa

Model tests made at the Rocky Mountain Hydraulic Laboratory at Allenspark, Colorado, during the past two summers indicate that a flexible mat placed around a bridge pier may prove effective in reducing the depth of scour. The mat principle is envisioned as being adapted for use at piers of small railroad and highway bridges where unpredictable amounts of scour continue to pose an unsolved problem and where more expensive preventive methods are not justified.

The test setup is shown above, being a flume with sand fed in at the upstream end to simulate incoming bed-load movement. For a twin-bridge pier model, two glass graduates three inches in diameter were placed 6 in. apart on the centerline of the flume. A flexible mat, made of a link chain wound about the pier in a spiral one layer thick and held by radial cords, was 9 in. in external diameter, or three times the pier diameter. The first turn around the pier was loose enough to permit free vertical movement between the mat and the pier.

Identical tests were made with and without the mat protection on the upstream pier where the greatest scour was found to occur. No protection was necessary for the downstream pier since, with the spacing used, it was sufficiently protected by the upstream pier. Each test consisted of normal flow for two hours followed by high-velocity flow for one hour producing the profiles shown in the accompanying sketch. Comparison of the profiles shows the effect of the mat in reducing scour. On the downstream side of the pier the mat prevented any scour below the average bed level. On the upstream side the scour was greatly reduced, and it is probable that if a thicker or more closely meshed mat



FLEXIBLE MAT reduces upstream scour one third and eliminates downstream scour entirely. Bridge pier model is a glass tube. Figures on glass tubes are reversed because observations on flow were made from inside outward.

How the model looked at the end of the test—some scour upstream, none downstream.

had been provided at that point, even less scour would have occurred.

The primary function of the mat is to reduce the velocity of flow at the bed below that required to produce scour. On the upstream side of the pier the increased head due to the deceleration of the oncoming flow causes flow downward through the mat, which accounts for the scour that does occur there.

A suitable mat, in practice, must have two essential mechanical characteristics. It must have a certain amount of lateral stiffness since the oncoming flow tends to compress it on the upstream side. At the same time it must be flexible or jointed in order for the periphery of the mat to adjust itself to local changes in bed elevation. This was demonstrated by the link-chain mat of the model. As holes were eroded off the edge of the mat by vortex action, the mat descended with the bed until further scour was prevented.

In contrast to the success with the link-chain type of mat, no real protection was obtained in tests with stiff, impervious mats. Once local scour got beneath the edges of these stiff mats, it took only a short time for the entire bed around the pier to erode as if no mat were there at all.

One of the principal virtues of the flexible mat type of protection was shown by a supplementary test over a period of two and one-half days with no incoming bed load to the flume. In that time the average bed level washed down 1.8 in., and the mat, rather than becoming ineffective, followed the bed down with the same character of scour on the upstream side and deposition of scour-hole fill on the downstream side of the pier. This is felt to be of much importance because the elevation of an erodible streambed will be lower in time of floods, and the mat must therefore be able to adapt itself to the general bed lowering in order to continue to protect the pier.

The link-chain mat was selected because it was readily available and was well suited for use on the model. But what type of mat will have similar characteristics at prototype scale and at the same time meet the requirements of low cost and easy installation, will have to be determined by future tests. It is possible that satisfactory mats could be made of reinforced concrete blocks cast on heavy-cloth reinforcing fabric patterned after the articulated concrete mats used on Mississippi River revetments. The Rocky Mountain Laboratory expects to carry out prototype tests within the limits of its resources.

Observations on the flow directions at the model pier were made by observing the movement of sand grains. This was facilitated by looking through the thin glass walls of the tube from the inside outward by means of a movable 45-deg. mirror mounted on a rod. This method had been adopted from the start of operations a year ago at the suggestion of Gerald H. Matthes, president of the Rocky Mountain Hydraulic Laboratory. It overcame the difficulty experienced in all of the older laboratory experiments made on wooden bridge pier models in this country and abroad, where turbidity had proved a baffling obstacle to visualizing the flow pattern.

The flow in this case was clearly shown to be downward next to the pier, which excavated a hole 3.8 in. in depth, as shown in the accompanying drawing. At the model scale, assuming the bridge pier to ft in diameter, the depth of water represented would be about 51 ft and the depth of scour below the stream bed 7½ ft.

The observations at the Rocky Mountain Hydraulic Laboratory were favored by the exceptional clearness of the water used and by the brightness of the daylight at that altitude (8,000 ft). These made it possible to study sand particle movement not only adjacent to the glass pier but also at points beyond, including a part of the model river bed not affected by the presence of the pier.

A large part of the experimental work at the laboratory this past year was done by Angel Lazaro, Martiniano Ligon, Gilberto Mercado, and Ramiro Regalado, all engineers from the Philippine Islands, then pursuing graduate studies in the United States under the provisions of Public Law 370. The writer was in immediate charge of the tests, which were planned by Prof. Chesley J. Posey, the director of the laboratory. The laboratory is organized as a non-profit organization of engineers and scientists, operating in the summer months. Expenses of the bridge pier tests were paid from donations made by members of the Laboratory's board of trustees, who also contributed valuable assistance.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York author of Legal Phrases of Construction Contracts (McGraw-Hill)

Construction of Contracts

The object of construing a contract is to ascertain the intention of the parties at the time of contracting. Where the contract is written, the intention of the parties must, if possible, be obtained from the writing alone. However, if a clause in a contract is of doubtful or ambiguous meaning, it is proper to search for its true meaning in the light of the existing circumstances.

A contract may be explained by reference to the circumstances under which it was made and the matter to which it relates. And where a contract is ambiguous, and it is impossible to ascertain the intention of the parties thereto from the writing alone, the subsequent acts of the parties showing the construction they put upon the agreement themselves may be looked to by the court.

Generally, where several instruments are executed as part of the same transaction, they should be interpreted or construed together.

It is only when two or more writings are executed at the same time and between the same parties and concern the same subject matter or it not executed at the same time, refer to same subject matter and show they were executed as a means of carrying out the intent of the other, may they be construed together.

A distinct, collateral oral agreement, not inconsistent with the written contract, is not necessarily merged therein, and may be enforced though not referred to in the written contract, which oral agreement constituted an inducement for the making of the written contract.

Notes on Specifications

Where the specifications describing the manner in which the work was to be done contained notations in the margins indicating certain changes therein, and a litigation arose involving the question as to whether the changes were made before or after the execution of the contract, the court held that this was a matter to be submitted to jury to decide, after hearing all the evidence in the case.

A Decade of Improvement in Pavement Striping:

1940—3-mi per day, by hand . . .

1950—75-mi per day, by motor

Ohio Highways to Get the Best of Care

LAST OF A SERIES

NEW HIGHWAY CONSTRUCTION may get the headlines, but it's the day-by-day care and treatment of existing pavements that is keeping our highway plant within striking distance of traffic demands. Ohio is no exception; its highways not only must be well striped and well signed, for the safety and convenience of the motorist, but their fast growing rate of obsolescence is a matter of grave concern to maintenance engineers.

The Ohio state highway department has an ambitious over-all program this year. It not only is planning the biggest construction program in its history (ENR May 11, p. 32), and the problem of speeding construction and cutting road building costs is being attacked on many fronts (ENR May 18, p. 38), but its maintenance program is designed to give the best care and treatment to its existing highways.

The tremendous increase in heavy hauling during and since the war in Ohio—as in many other states—has necessitated great expenditures of time and money in pavement rehabilitation. Non-rigid pavements must be patched and resurfaced. Rigid pavements, made uneven and bumpy by subgrade movement under the impact of traffic, must be leveled up.

The Ohio State Highway Department's Bureau of Maintenance—pioneery in pavement leveling by subsealing—is headed by C. W. McCaughey, chief engineer, and J. W. Reppel, assistant chief engineer. Last year the bureau subsealed 338 mi of pavement for $224,000. This year, the program will be even more extensive.

Two methods have been developed for this work. One is "mud jacking" with a slurry, usually containing some cement. The other is bituminous subsealing with a heavy liquid asphalt.

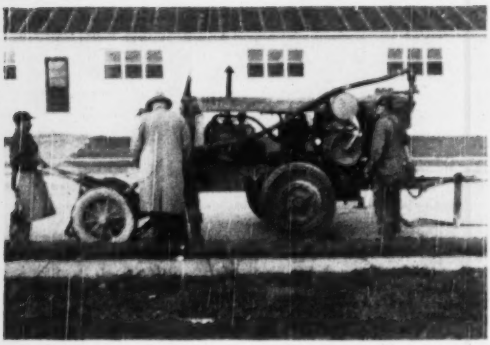
Mud-jacking is especially suitable for filling the larger subpavement voids and developing minor improvements in the riding surface of the pavement. Bituminous subsealing, although well suited for performing the entire operation of void filling and leveling, also is extremely well adapted to minor pavement leveling operations. Also it can complete work done by the mud-jacking method. Both methods involve puncturing of the pavement at appropriate places, using 2-in. drill, and inserting the mixture under pressure.

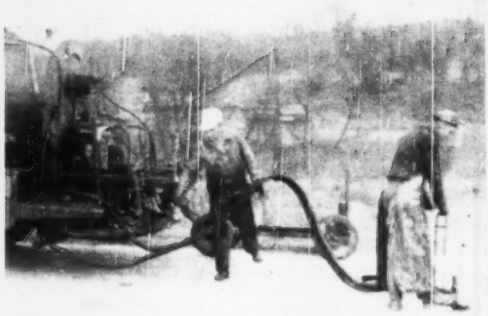
• Big maintenance program—Maintaining Ohio's 17,000 mi of state highway is a big job and getting bigger. The 1950 maintenance budget is $25,000,000, including snow removal, slightly larger than last year.

Largest single item is surface treating bituminous pavements. Last year 2,570 mi of highway were surface treated at a cost of $5,140,000. Also, 132 mi were given 1½-in. hot mix resurfacing, for $892,000. Bridge repair also is a full-time job. Last year the bureau widened, strengthened, or replaced 286 bridges over 10-ft span, for $525,000. Thirty-six of these were complete failures and 50 were partial failures. Most failures occurred from overloads; four were destroyed by floods and one small structure burned down.

Highway guardrail also is a big item; 80,000 lin ft were erected last year, 1,300,000 ft was cleaned and painted, and 70,000 ft of worn out rail was replaced. Dust laying, with bituminous materials and chemicals, was performed on 1,357 mi at a cost set by the highway bureau at $197,000.

The maintenance force also spends considerable effort on "de-slicking" old bituminous pavement, last year it treated 130 mi of pavement for $185,000. The process is simple and effective. Kentucky natural sandstone asphalt is applied at 8 to 10 lb per sq yd, in 2 or 3 applications. It is applied with a spinner-type from end-dump trucks. The pavement is fence-dragged after each application and finally rolled with a 5-ton roller or





PAVEMENT SUBSEALING—a big job in Ohio—is done by two methods: cement slurry (at left), and heavy liquid asphalt (at right).

with a pneumatic-tired roller before opening it to traffic.

Biggest single headache of the maintenance bureau is the fact that a great deal of the equipment purchased is designed for construction, not maintenance. This means that it has to be adapted for its particular maintenance operation. For example, before a patrol grader can be prepared properly for shoulder dressing, a baffle plate must be welded onto the end of the blade to keep the aggregate from spilling back onto the pavement.

Another difficult job is that of mounting snow plows on trucks. As truck manufacturers keep moving the front axle farther back to get more payload over the front axle, the more difficult it is becoming for cantilever the snow plow back to the front axle. Considering that 1,500 trucks must be adapted to mount snow plows, this is quite a problem.

The department contracts as much of its highway maintenance as possible during the peak season. So, 600,000 worth of maintenance was contracted last year. This permits concentration of the number of maintenance personnel which totals 4,500. In the winter they take care of snow removal on the entire system, during the rest of the year they do routine maintenance.

• **Maintenance by contract.** More and more contractors in Ohio are becoming interested in highway maintenance, especially bridge painting, guardrail erection and painting, surface treatment and subsealing. This not only adds to reduced costs to the work. For example, last year on the state's sealing program contracted with 1949—the low bid was 37¢ per gal of subsealing material. As more contracts were awarded throughout the year, contractors became more interested in the work and bidding became more spirited. As a result the low bid price on the last contract awarded last fall was 17.6¢ per gal.

Both the cost and the amount of work involved in snow removal are unknown and unpredictable. The department spent $1,725,000 on this work last year, which was $725,000 less than the previous year. Both were "light" winters. Two-thirds of the state are in the so-called "snow belt."

• **Traffic and safety.** Pavement striping at Ohio highways has been developed to a high point of mechanization and have production. The total volume of striping paint used in one year by the highway department would be enough to paint 15,000 average homes. The Division of Traffic and Safety, under Harry E. Neal, chief engineer, and R. S. Deely, traffic engineer, has developed motorized stripers capable of striking 10 to 12 mph. In comparison, walk-type stripers of a decade ago could complete less than 3 mi per road per day.

The first improved model were built in 1941. Since then the department has added five more stripers, each capable of striping 75 mi of two-line pavement per day with either one, two or three stripes. Each of the $15,000 motorized stripers has a two-compartment paint tank, 450 gal for white paint and 250 gal for yellow. All operating controls for the paint spray equipment are mounted at the rear of the striper, immediately in front of the spray operator.

Spray guns are mounted on a dolly riding on two 6-in pneumatic-tired wheels. It is hooked to the rear of the truck with a special quick-lock that enables the operator to move it a little to right or left of the normal position to compensate for deviations in the driver's lane or pavement alignment, especially on curves. The dolly is raised by an electric winch when the striping truck is in transit.

• **Three-man striping crew.** A three-man crew operates each striping machine: a driver, a spray operator, and a man to place warning guard cones along the freshly painted lines. The latter two men ride motorcycle saddles supported from a platform mounted at the rear of the truck. The stripers can apply two colors and three lines simultaneously where passing is restricted in each direction.

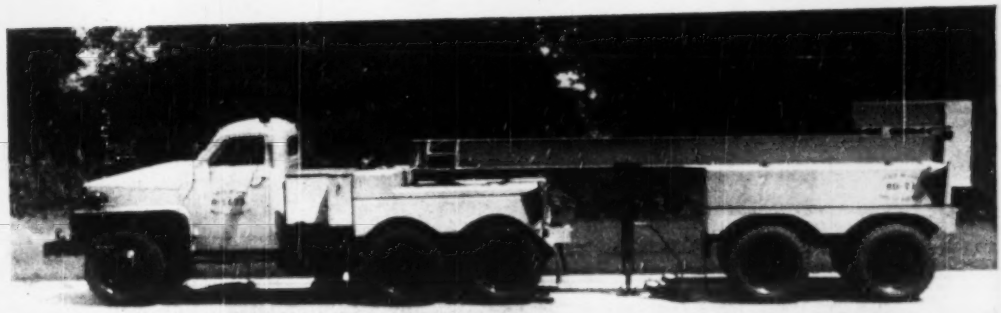
A loudspeaker mounts on the roof between the spray operator and the driver. A center wheel mounted on a modified A-frame assembly set in front of the truck serves as a guide for the driver on lines to be retraced or on a pre-spotted new line. The guide assembly folds up against the front of the truck when in transit.

About 1,500,000 gal of white and 500,000 gal of yellow paint are needed each year to mark 11,500 mi of center lines, line lines and edge lines surfacing lines on Ohio's pavements. All yellow paint used and about one-half of the white paint is of the reflectorized glass-bead type.

Last year the department made its own reflectorized paint by mixing the glass beads and the paint. Some savings in cost resulted but the proper degree of reflectorizing was not secured. This year it will resume the buying of some premixed reflectorized paint.

Ohio prefers the solid centerline to a dashed line for three reasons: the solid line gives less eyestrain for motorists, it is difficult to retrace a dou dashed line, and more miles of solid line can be done per day than when painting a dashed line. Overall costs of either method of striping are believed to be about the same.

The cost of pavement striping in Ohio last year was $870,000 as compared with $650,000 in 1948 for the same program. This reduction in cost is due chiefly to more mechanized and more efficient methods of applying the



PAVEMENT STRENGTHS are checked by plate-bearing tests performed with special truck and trailer of the research division.

paint. The costs of paint has been reduced, but they have been offset by rising labor costs.

• **Bigger stop signs**—A second noteworthy activity of the Division of Traffic and Safety is that of improving the "signing" of its highways. Stop signs and both distance and direction signs are being made larger. The latter two types of signs also are being erected from 250 to 400 ft in advance of intersections as an aid to the motorist. A large number of safe-speed signs also will be erected this year on curves that cannot be negotiated safely at 50 mph.

The installation, maintenance and operation of traffic signals is an ever increasing job. At the present time, 200 signals of several types are operated at rural highway intersections on the state system. The majority of the "stop-and-go" signals are traffic actuated, which are more suitable for rural intersections. They eliminate unnecessary delay and provide greater safety. A single vehicle on the first in a group of vehicles on the secondary road cannot receive the green light until the approach speed has been reduced to a crawl's pace or required to stop.

Two specialized trained crews working out of the central office install and service the traffic signals. A mobile trenching machine was the most recent equipment furnished the crews. Great savings resulted in manpower and in man-hours required for an installation. Originally, traffic signals were installed by contract. But this proved very costly and unsatisfactory, so it was discontinued in the early days of traffic signals in favor of state installation with its own crews.

• **Research activities**—From the standpoint of research, the Ohio Highway Department is interested, among other things, in improving the quality of its waterbound macadam pavements also simplifying this type of construction to reduce its cost.

To this end, a 1,000-ft test section of waterbound macadam pavement was constructed last year under the supervision of Charles W. Allen, research engineer, and Harry E. Hallock, assistant research engineer. Construction methods followed conventional procedure, with two exceptions: (1) the granular slag base was placed in a single 8-in. course (compacted thickness) instead of two 4-in. courses ordinarily used, and (2) a self-propelled vibrating machine was used to key the slag with binder for its full depth of 8 in.

The test was made chiefly to determine if the single course construction was feasible for an 8-in. thickness. For a control, the same equipment was used on the rest of the construction project, involving two 4-in. thicknesses of granulated slag base.

Plate-bearing tests on the completed sections indicated that the bearing strength of the 8-in. single course of waterbound base was equal to that of the two 4-in. courses of waterbound material in the control section.

A second research activity last year was that of plate-bearing tests on various pavements and embankments under construction. Results were startling on one project under construction. The compacted subgrade tested amply strong to carry the superimposed pavement and legal truck loadings, but it was not strong enough to carry the heavy earth-moving equipment being used by the contractor.

• **Rubber-bituminous surfacing**—The third chief research activity is in the use of rubber in hot-mix bituminous surfacing. Four test sections were built last year, each included in a resurfacing contract. One project is in Akron, one in Columbus, and two on rural state highways.

Natural, synthetic and reclaimed rubbers were used in relatively small quantities—5% of the weight of asphalt for the natural and synthetic rubbers and 7½% for reclaimed rubbers. Skidding tests will be conducted this summer on all four test sections. But it will be some time before the temperature-susceptibility properties and adhesion characteristics of the rubber-bituminous mixes can be determined.

• **Materials testing**—Controlling the quality of road building materials for Ohio's highways and bridges has been developed to a high degree since the department's laboratory was established 41 years ago. Today, the accent is on speed and efficiency to make every day of the construction season count in terms of highways repaired.

Each of the 12 division offices has an aggregate testing engineer, in teletype contact with the central laboratory at Ohio State University. R. R. Litchiser is chief engineer of the laboratory. Portland cement, tars and asphalts, for big jobs, are tested at the source of supply, so are reinforcing steel, pipe, and tile and other materials.

Other activities of the laboratory, developed especially to avoid costly shut-downs of construction projects, include: (1) close supervision, with daily samples and reports, of the manufacture of all bituminous concrete; and (2) quick trouble-shooting assistance on problems involved in portland cement concrete, and those in highway subgrades and bridge foundations.

The laboratory also prepares subgrade profiles which are credited with saving considerable construction time. Last year, it prepared subgrade profiles for 64 projects totaling 145 mi of primary roads. It also tested 45,100 samples of construction materials of all types.

FIELD AND OFFICE

Flat-Slab Formulas Simplify Design Calculations

According to the requirements of the building code of the American Concrete Institute, the design of a flat slab is governed by the total bending moment of a panel (numerical sum of positive and negative moments acting in either direction). This moment is given by the formula

$$M = 0.09\,W\,L_2\left(1 - \frac{2c}{3L_1}\right)^2$$

Since W in this equation is the total live and dead load on a panel, it implies that the thickness of the slab has to be determined in advance. This is avoided by using the direct design formula given in the accompanying table.

These formulas have been developed by introducing the value of 12.5 d psf on the dead load of the effective slab and by solving the subsequently produced quadratic equation for the effective slab thickness d. All terminals are based on the moment factors and other requirements of the American Concrete Institute building code (ASA 65, chap. 16).

The formula for bending moment in the formula for shear, the edge moment of the folded area, the moment through the steel capital or dropped panel, including marginal or clear-span width of the effective slab thickness, was slightly approximated in order not to complicate the equations unnecessarily.

In the expression $0.09\,W\,L_2\left(1 - \frac{2c}{3L_1}\right)^2$, the minimum slab thickness as required for bending or shear has to be determined separately. The greater one of the two values then has to be checked with the limitations of the code before the final choice is made.

Notations

L_1 = greater span length of slab, c to c of columns, ft;

L_2 = smaller span length of slab, c to c of columns, ft;

c = diameter or width of square column capital in direction of L_1, ft;

$L_1 - c$ = width of dropped panel, ft;

p_d = live load plus dead load, except for the weight of the effective slab, psf;

$L_1 - L_2$ = plus flooring plus ceiling plus weight of partitions for fire enforcement, psf;

$K = 5\,L_1 L_2$, as used in the design formula $d = M/K$;

s = allowable shear in the slab, psi;

q = total load (psf) less weight of chosen effective slab (psf). Used in design of dropped panel only after thickness of slab has already been found;

t = Slab thickness without drop panel, in.;

t_1 = Slab thickness with drop panel, in.;

t_2 = Thickness through drop panel, in.

Example

Suppose, for instance, that an exterior panel is to be designed, with $L_1 = 30$ ft, $L_2 = 25$ ft, $c = 1$ ft, $L_1 - L_2 = 500$ psf flooring, weighing 10 psf, $f'_c = 2{,}500$ psi, $K = 196$ and $s = 75$ psi. Capitals are square.

Bending in slab:

$$E = \left(1 - \frac{2 \times 1}{3 \times 30}\right)^2 \frac{30}{196} = 3.44$$

$$p_d = 80 + 10 + 12.5 = 322.5$$

$$t_1 = 0.38 \times 3.44 \times 1 = 1.3$$

$$d = 0.85 \times 322.5 \times 3.44 \times 1 = 10.7 \text{ in.}$$

Shear in slab:

$$A = 30 \times 25 - 1.30 \times 11 = 593$$

$$s = 3 \times 11 = 0.03 \times 593.75 = 25.9$$

$$t_1 = \frac{25.9 - 500}{322.5} \times 7 \times 75 = 25.9 = 1.5$$

$$= 7.7 \text{ in.}$$

Minimum $t = 0.3 \times 30 = 9$ in. Use 11 in.

Bending at drop panel:

$$d = 300 - 10^2 \times 12.5 = 11 = 148^2$$

$$E = 3.44$$

$$t_2 = 0.26 \times 148 \times 25 \times 3.44 \times 11 = 1.5 = 16.9 \text{ in.}$$

Shear at drop panel:

$$A_1 = 0.60 \times 30 \times 25 = 675$$

$$t_2 = \frac{A_1 \times q - 675 \times 148 - 17 \times 75}{3 \times 6 = 1.5} = 13.5 \text{ in. Use } 17 \text{ in.}$$

Maximum drop = $1.5 \times 11 = 9 = 7.5$ in.

Actual drop = $t_2 - t = 17 - 11 = 6$ in.

If the capitals are round, the calculations for shear through the drop panel would be modified:

$$A_1 = 0.52 \times 30 \times 25 = 600$$

$$t_2 = \frac{A_1 \times q - 600 \times 148 - 5.5 \times 75}{3 \times 6 = 1.5} = 15 \text{ in.}$$

However, the depth of the drop panel would be inadequate to resist the shear that required with square capitals, that required with square capitals.

Lutz Kavanaugh, structural engineer; Albert Kahn Associated Architects and Engineers.

THICKNESS OF FLAT SLABS

	t Without drop panel	t_1 With drop panel	t_2 Through drop
	Bending: $E = \left[1 - \frac{2}{3L}\right]^2 \frac{L}{K}$		
Interior Panel	$0.09E(1 - \frac{2c}{3L})^2 \times L = 0.25\sqrt{E} \times L = 1.5$	$0.09E(1 - \frac{2c}{3L})^2 \times L = 0.53\sqrt{E} \times L = 1$	$0.25 \times \sqrt{E} \times L = 1.5$
Exterior Panel			
Restrained Edge	$0.75E(1 - \frac{2c}{3L})^2 \times L = 0.21\sqrt{E} \times L = 1.5$	$0.58E(1 - \frac{2c}{3L})^2 \times L = 0.43\sqrt{E} \times L = 1$	$0.20 \times \sqrt{E} \times L = 1.5$
Freely Supported Edge	$0.98E(1 - \frac{2c}{3L})^2 \times L = 0.19\sqrt{E} \times L = 1.5$	$0.56E(1 - \frac{2c}{3L})^2 \times L = 0.39\sqrt{E} \times L = 1$	$0.20 \times \sqrt{E} \times L = 1.5$
	Shear		
Square Capital	$V = \frac{A \times q}{3} = 1.5$ $A = 0.35\,L^2$ $c = \frac{L}{3} - 0.94\,t$		$V = \frac{A_1 \times q}{3} = 3t = 1.5$ $A = 0.9\,L^2$ $V = \frac{A_1 \times q}{3} = a_1 = 1.5$ $A = L^2 - 1.3a^2$
Round Capital	$V = \frac{A \times q}{3} = 3.5\,t = 1.5$ $A = 0.96\,L^2$ $c = \frac{L}{3} - 1.1\,t$	$V = \frac{A_1 \times q}{3} = 3t = 0.94\,t_2$	$V = \frac{A_1 \times q}{3} = 3.5t = 3t = 1.5$ $A = 0.92\,L^2$
	Maximum $0.33\,L$	Maximum $0.33\,L$	Maximum $1.5t = c = t_2$

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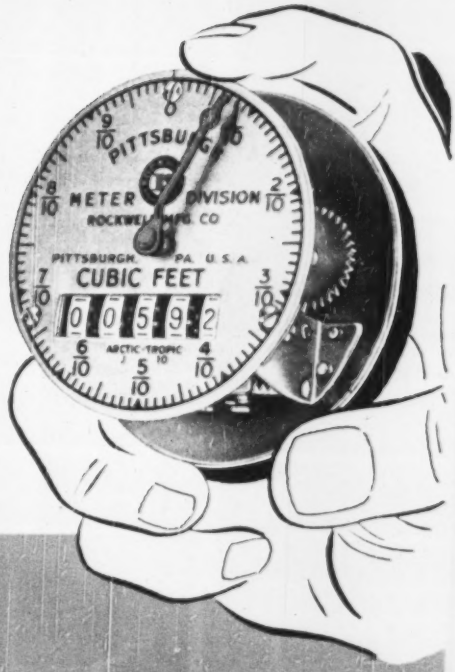

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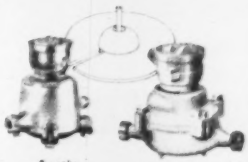

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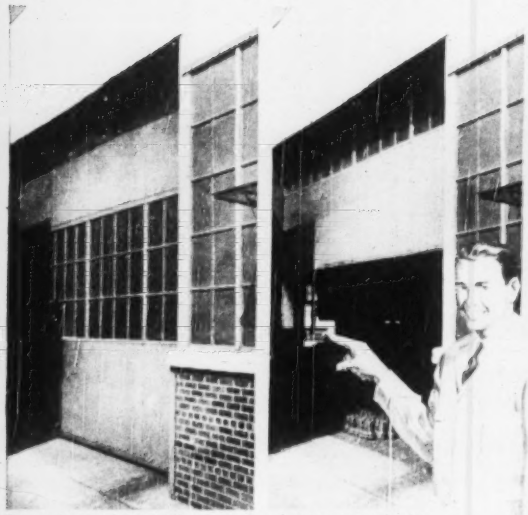
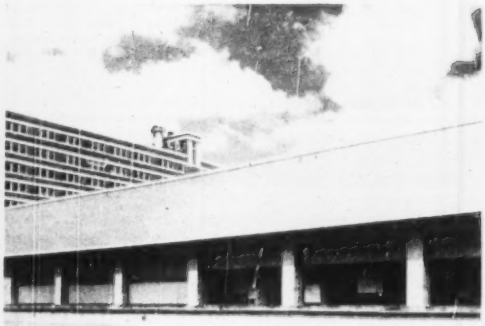


Truscon Vertical Lift Steel Door in closed and open position. Chrysler Corporation Building, Highland Park, Michigan. O. W. Burke Co., Contractor. Albert Kahn Associates, Architects and Engineers.



29 openings of Truscon Vertical Lift Steel Doors (manually operated) in the Sears-Roebuck warehouse, Dallas, Texas. George L. Dahl, Architect. Dolph Construction Company, Contractors. In both the electrically- and manually-operated types of Truscon Vertical Lift Steel Doors, the leaves are perfectly balanced by counterweights to assure easy operation and control in any position.

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READER COMMENT

Balanced Economy in Design

Sir: The article, "Lowest Cost Framing for Small Buildings," on p. 39 of the April 20 issue is timely and interesting. However, a review of the design details presented raises the question of whether this is intended as a practical design or as a rough comparison.

The conclusions reached with reference to rigid frame design, Scheme D, confirms my experience. But Schemes A and B are not comparable to Scheme C: Purlin spacing is not the same, Scheme B would be stiffer laterally than Scheme C, even with the knee braces omitted. Scheme B, with 20-ft unsupported height, would require an intermediate strut to make this size column meet current AISC specifications. Scheme C provides bracing for transfer of end wall wind loads to side walls, whereas A and B depend upon roof deck.

All four designs apparently depend on roof deck to transfer side wall wind loads to end walls. If this is not the case, Scheme C is not acceptable unless the joists on column lines are designed for portal stresses.

Roof sheathing is to be 2-in. plank. Permissible maximum span is governed by deflection rather than strength, and tongue and groove boards are generally used to obtain load transfer, so that individual boards need not support concentrations between purlins. The 8-ft 6-in. purlin spacing shown for schemes A and B would be excessive, and if sub-purlins were used, cost would be increased.

Common experience is that 6 ft is the desirable maximum single span for 2-in. plank, and that 7 ft is satisfactory if plank are continuous over two spans. Eight-foot spans require a distributor at the midpoint to make an acceptable deck, as the matching does not suffice. This increases cost to a point where the economy of 8-ft spans is questionable.

Commercial lengths of lumber are in increments of 2 ft, such as 12, 14, 16, 18. This should be a consideration in laying out purlin spacing, to eliminate waste, if economy is an objective.

The assumed roof loads are much higher than would be accounted for by snow plus dead load. For main spans of 68 ft as shown, longer bays will be found more economical, in spite of the heavier purlins required. For instance, Scheme A, with six 18-ft 7½-in. bays, would require only five bents, with a saving in weight of 3,600 lb, while five 22-ft 7-in. bays would have four bents, with a saving in weight of 10,600 lb, fewer pieces to erect and some footings eliminated.

If roof deck is to transfer wind loads to the walls, knee braces could be omitted. In any case, even light end connections on the girders would develop the columns. This would improve both the clearance and the appearance.

If wood bowstring trusses were not considered because of maintenance, it is possible a steel bowstring truss could be used, in the 1:8½ diagonal in the truss in Scheme B could be reversed and the roof lapped. This would eliminate the need for an additional strut and would save some additional steel, as well as some height in the side wall. The appearance would of course not be the same, but should be acceptable for a building of this type.

Timber purlins would cost less than the steel purlins shown, which in addition to the material noted, would require bolted-on nailer strips for attaching of roof sheathing.

In conclusion, the usual approach to such a problem is to look for balanced economy. Framing should be laid out for commercial lengths of lumber to reduce waste. It should be noted that minimum height of side walls may be a determining factor and that the extra height of a truss is often required to suit heaters or ventilating equipment.

Aside from this problem, but of general interest, is that we have found welded, steel arch frames to be more economical in this territory than laminated timber arches, particularly when these are concealed by the finished work.

These considerations are in general always applicable, but are modified to some extent by price relationships, which are naturally subject to change.

ARTHUR L. ROWE
Arthur L. Rowe & Associates
Cleveland 14, Ohio

Safe Blasting

Sir: In "Will My Blasting Damage Property?" ENR May 4, p. 563, formula 3a should read

$$v = 160 \left(\frac{50}{D}\right)^2 = K \qquad 3a$$

F. J. CRANDELL
Liberty Mutual Insurance Co.
Boston, Mass.

Arched Roof...

Darex AEA concrete was used in this U. S. A. F. Bomber Base hangar, at Limestone, Maine, because of its increased workability, better placeability. Photo courtesy U. S. Engineers.

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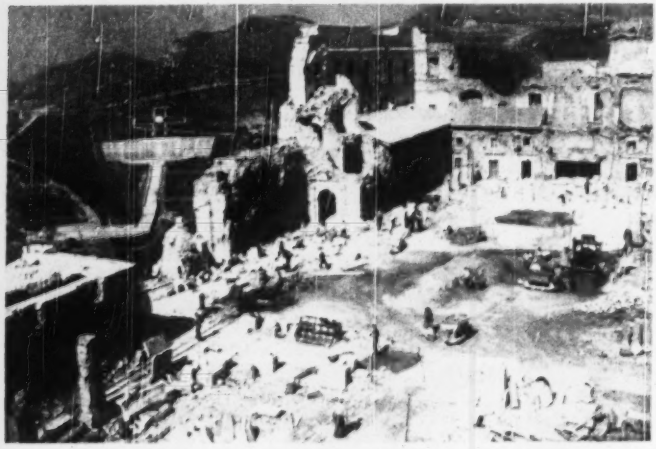


REBUILDING CASSINO ABBEY—View of the reconstruction work going on at the Abbey of Monte Cassino, Italy, which, with its adjoining town, was destroyed by Allied bombing in 1944. In the left background is the Polish war cemetery on a slope facing the abbey. The town also is being rebuilt.—Wide World photo.

Western European R.R.'s are showing progress

In the last two years the equivalent of $162,000,000 in Marshall Plan counterpart funds (foreign currency deposited by governments to match ECA dollar grants) have been spent to put western European railroads back in service.

The case of France is typical. There most of the rolling stock was destroyed or taken by the Germans. Today, railroads are giving the equivalent of their prewar service, or better in many cases.

France has withdrawn about $168,200,000 from its counterpart fund to repair tracks, rebuild stations and bridges, and modernize service through electrification. Replacing 750 steam locomotives with 250 electric engines is expected to result in substantial savings. Along the Paris-Lyons line, for example, it is estimated that electrification will save about 660,000 tons of coal annually and about $7,000,000.

Big Argentine pipeline now in operation

Three years after construction started, two major cities in the Argentine are already using natural gas delivered by the 1075-mile pipeline, the Gasoducto Presidente Peron, which stretches from Comodoro Rivadavia, Atlantic port in the heart of the petroleum and gas fields, to the capital.

Buenos Aires began receiving natural gas last year and about two months ago the fuel was turned into the consumer pipe network of Puerto Madryn, naval base. Bahia Blanca, 570 miles southwest of the capital, is scheduled to have local distribution in operation before the end of this year.

Engineers are expanding their plans to envisage an eventual pipline network which will tap new fields and finally supply most of the country's leading metropolitan centers with natural gas.

ECA aid is now sought for colonial development

A few weeks ago, a special conference was held in Paris by representatives of Great Britain, France, Belgium, Portugal, South Africa, and Southern Rhodesia to consider colonial development programs.

According to the McGraw-Hill World News representative in Paris, at that conference the United States unofficially urged Europeans to hire American engineering concerns, such as Overseas Consultants, Inc., to survey the African transport problem, but the British and others turned down the suggestion.

Governments in the European recovery group first submitted lists of projects for ten years ahead. Now they are submitting detailed projects, especially road and harbor developments in Africa. The biggest demand is for modern U. S. road-building machinery.

Added up, the total 10-year colonial programs amount to seven billion dollars, or if Indonesia is included, almost nine billion dollars. It is estimated that from 10 to 15 percent of the total is required in dollars for American equipment.

Foreign Briefs

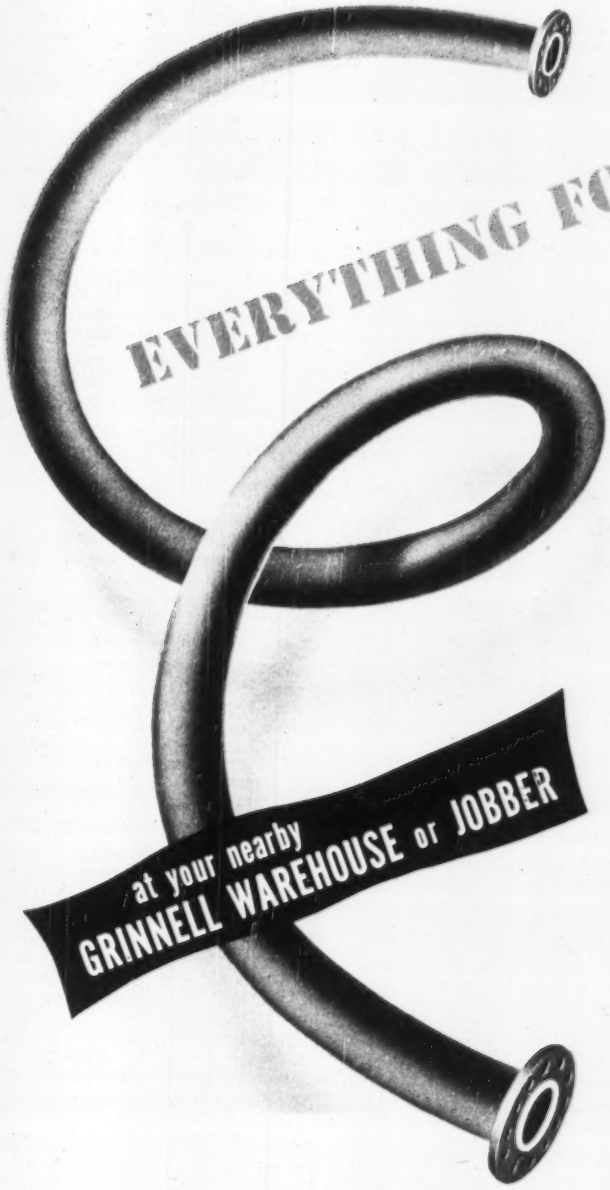
To help Pakistan—Frederick W. Wilhelm, head of the office of production planning and control in the Denver, Colo., engineering center of the Bureau of Reclamation, has gone to Pakistan at its request to assist its engineers in a study of the development of the industrial, agricultural and water economy of certain river basins. Pakistan officials are interested in the possibility of multi-purpose resource development along the lines of Missouri River Basin and Central Valley of California projects now under construction. Mr. Wilhelm has had extensive planning and construction experience. He is a civil engineering graduate of R.P.I. and has the degree of M.S. in civil engineering, University of Colorado.

Large order from Egypt—A $5,337,000 order for a 45,000 kw steam electric generating station to aid drainage and irrigation work along the Nile has been placed with the Westinghouse Electric International Co. by the Egyptian Ministry of Public Works. The new power station at Talkha, 90 miles north of Cairo, on the east branch of the Nile, will be the largest tying into the electrical network which powers pumping stations in the Delta region where reclamation work is going on to increase production of long-staple cotton and rice.

Port enlargement—The Dominican Republic has started a $2,500,000 project to deepen and widen the port of Barahona.

Business for U. S. manufacturers—Nearly $1,600,000 worth of equipment contracts have been placed with American industry by foreign governments as a direct result of technical assistance in water resources development extended by the Bureau of Reclamation, according to Oscar L. Chapman, Secretary of the Interior. Besides that, this assistance has aided foreign countries to improve their economy by the construction of dams, hydroelectric power plants, and other water resources developments.

(Continued on page 55)



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For power, for value, for every job

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Year after year the nation's truck users buy more Chevrolet trucks than any other make. For every kind of trucking job they prefer Chevrolet power and Chevrolet value.

Now, Chevrolet's two rugged valve-in-head engines give more power than ever. Advance design, solid construction and low prices give Chevrolet more value than ever.

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Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—*proof* of the owner satisfaction they have earned throughout the years.

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The new Chevrolet P·L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

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Foreign Briefs

Port reconstruction—The government of Iran plans reconstruction of the port of Khorramshahr at a cost of $5,550,000.

U.S. bids sought—Bids will be asked in the United States, Canada, Great Britain, South Africa and New Zealand for the driving of the Rimutaka tunnel, one of the greatest ever planned in New Zealand. The tunnel will be of conventional horseshoe section and will take a single-track, 5 ft 6 in. gage electric railway. Length between portals, nearly 5½ miles. Excavation almost entirely in rock.

For Turkish highways—The Economic Cooperation Administration has announced in Washington and Ankara approval of a project for the improvement of the Turkish national highway system. The project involves $9,000,000 in ECA funds, but only a portion calling for a little over $5,000,000 in ECA funds is approved at this time. The Bureau of Public Roads is planning and managing the highway construction in cooperation with Turkish authorities.

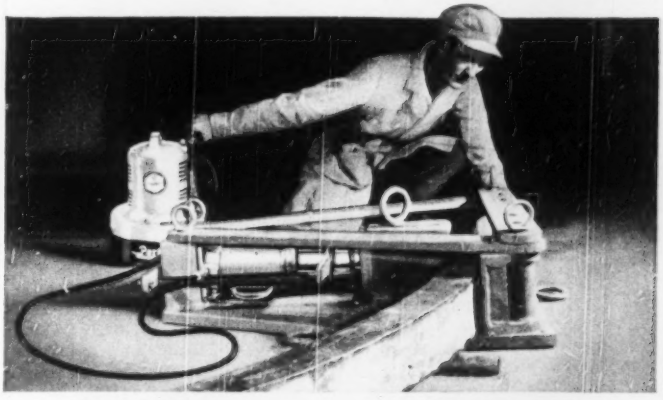
Building Research congress—A congress on building research will take place in London September 11-20, 1951. It is sponsored by the British professional institutions and learned societies interested in building science, and by government departments, with the support of representative industrial federations in Great Britain. The purpose will be to review the progress made in research in relation to architecture, building, and associated branches of civil engineering.

Brazilian roads—A 5-year road building program is to be carried out in the state of Parana in the northern part of Brazil. It includes the building of two highways. One, between Ponta Grossa and Curitiba, will be about 88 miles long and it will cost about $10,000,000. Work is to start soon. Another, to begin later, is to run from Jaguariaiva and the seaport of Antonina, a distance of 122 miles and cost about $20,000,000. Contracts have been awarded to a firm affiliated with the Banco Hipotecario Comercio S. A., Rio de Janeiro, which seeks the collaboration of U. S. manufacturers of road building equipment and road construction concerns in the sale or rental of equipment, or supplying equipment and collaborating in the execution of this work, with participation in the profits.

Continued on page 59

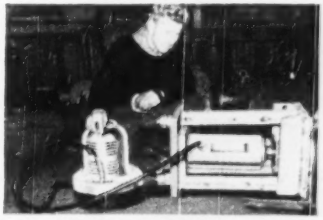
MOTORIZE

your hydraulic equipment with this low-cost, portable pump



YOU CAN HOOK THE MOTOR-DRIVEN PUMP TO HAND JACKS, TOO!

The P-182 Blackhawk *electrically-driven* high-pressure pump serves one or more hydraulic hand jacks or rams. Hand jacks are easily modified in the field for use with the P-182. Above—the P-182 operates a 50-ton Blackhawk Jack in a special shop-built strut-bender . . . one of many P-182 applications.



ZIP UP MAINTENANCE

Here the motor-driven pump operates a 50-ton Blackhawk "Porto-Power" ram which is harnessed to pull an electric motor gear. Other "Porto-Power" rams include 2, 4, 7, 10 and 20-ton sizes.

TRIPLE YOUR OUTPUT!

A Blackhawk Pipe Bender is fast. But connect it to the motorized pump (as above) and it can turn out three times the work, particularly on repetitive or production bending.

Ask for **Porto-Power** Pump No. P-182

Weighs only 85 lbs. Develops 10,000 p.s.i. Series one of three basic combinations to suit highly-varied and individual needs. Only $[illegible]. For free bulletin describing P-182 and other Blackhawk Porto-Power Equipment, write direct to factory at address below.

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Rush free literature on the P-182 motor-driven pump and other Blackhawk Hydraulic Equipment.

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...The Most Versatile Tractor Ever Built

Engineered Completely New from the Ground Up with Big Tractor Design, Balance and Stamina

Weight:
10,500 lbs. — 44" tread
11,250 lbs. — 60" tread

Speeds:
5 forward, to 5.47 m.p.h.
1 reverse, to 1.99 m.p.h.

Horsepower:
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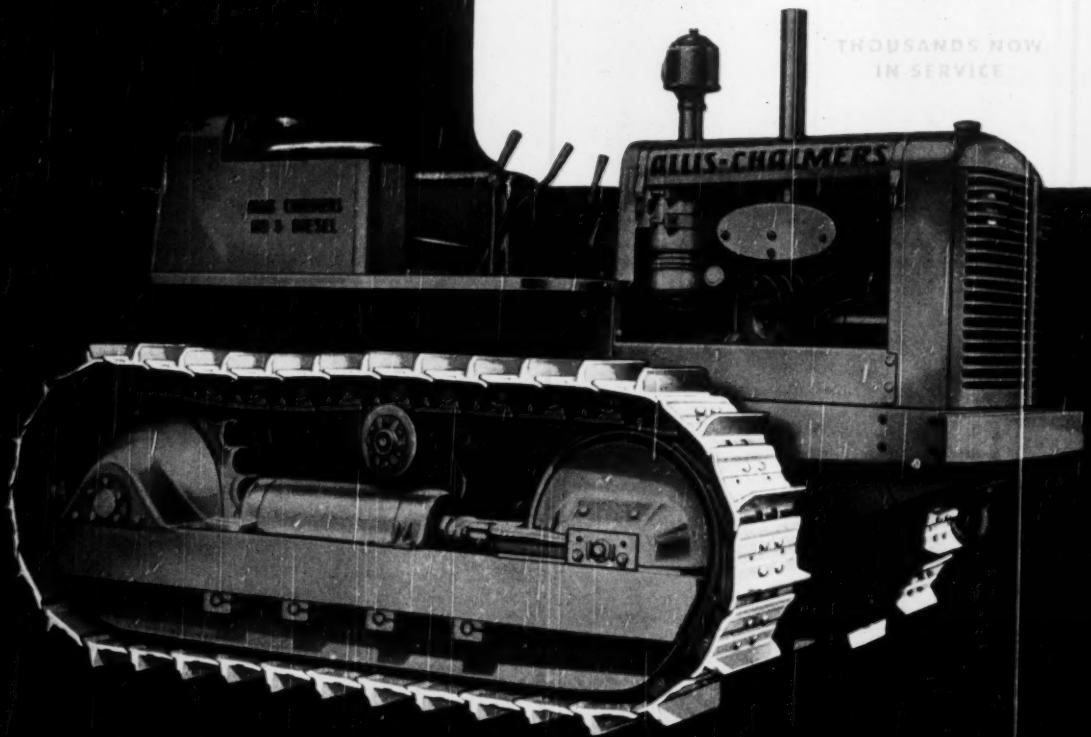
Engine:
General Motors 2-Cycle Diesel



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Hydraulic Bulldozers and Gradebuilders (track or engine-mounted models).
Root Ripper (interchangeable with bulldozer or gradebuilder moldboards).
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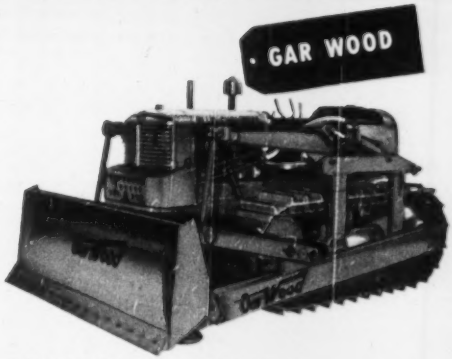
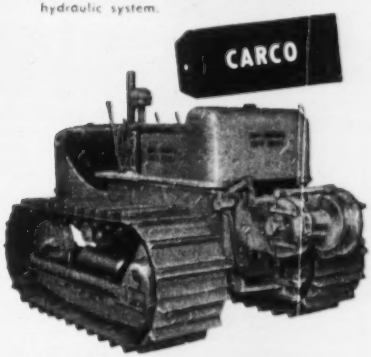


Hydraulic Bulldozers and Dozecasters.
2-Wheel Hydraulic Scrapers. Hydraulic system optional. Scraper can be hooked in with bulldozer or Tracto-Shovel hydraulic system.

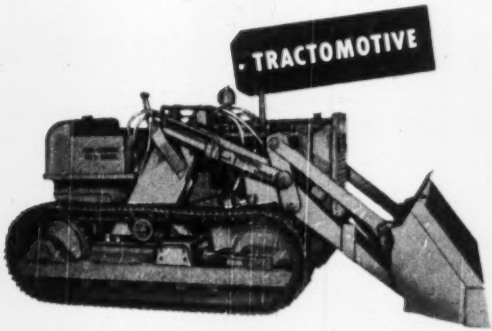
..with Its Wide Range of FULLY MATCHED Allied Equipment

Each Allied manufacturer, firmly established and skilled in his own field, worked in complete cooperation with Allis-Chalmers in the development of this auxiliary equipment.

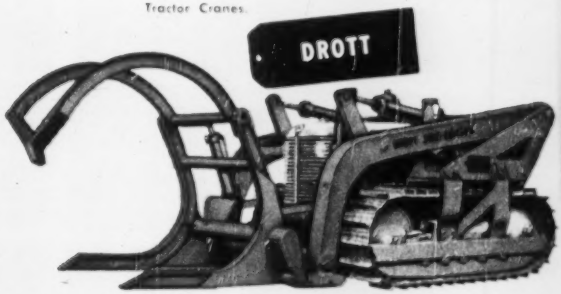
Yes, the HD-5 with any Allied unit is a fully matched power package ... matched for greater output at lower cost.



Straight and Angle Blade Hydradozers.
Land-clearing Blades: alone or in combination with dirt-moving blades.
Logging Canopies.
Winches for construction, logging, oil fields, other operations.
Log Carts.
Tractor Cranes.



TRACTO-SHOVEL ... with interchangeable attachments for handling a wide variety of jobs—dirt, material and rock-handling buckets, bucket teeth, bulldozer and angledozer blades, lift fork, crane hook, trench hoe, V-type snowplow, drag bucket, tine fork and rock fork.



SKID-LOADER ... with interchangeable racks for transporting, loading and unloading pulpwood, logs, stumps, lumber, ties, slabs and edgings, slash, mine props and other wood.

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For Greater Production...
For Easier Operation...
For Simplified Servicing

Here today – *and still here tomorrow*

THAT'S THE STORY OF SANTA FE'S CONCRETE STREETS

Don Gaspar Ave., paved in 1912.
Photos taken in 1925 and 1949.

Santa Fe, N. M., paved its first street with concrete in 1912. Today the majority of the city's paved streets are concrete.

Santa Fe motorists and taxpayers have reason to be proud of these streets, examples of which are shown on this page, for they have given long, faithful, ***low-annual-cost*** service and are still carrying traffic of ever-increasing weights and volume.

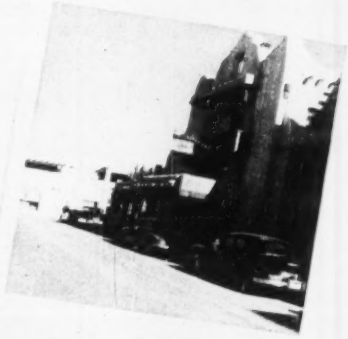
In recent years, the load has been particularly heavy because shipments to the Atomic Energy Commission town of Los Alamos move from the railhead at Santa Fe over the city's streets.

Dave Thornburg, City Engineer, states: "Since the streets were paved the maintenance cost has averaged less than $65 per mile per year."

The outstanding durability and ***low annual cost*** of these Santa Fe streets are typical of concrete pavements all over America. Concrete pavements are also safer—day or night, wet or dry—because concrete's gritty surface is uniformly skid-resistant and its light color provides greatest visibility at night.

Concrete pavements usually cost less to build than other pavements of equal load carrying capacity. They require much less maintenance and give longer service. Thus they render real ***low-annual-cost*** service—the true measure of pavement cost.

For more information write today for a free copy of *"Concrete Pavement Design."* Distributed only in the United States and Canada.



Shelby St., paved in 1921.
Photos taken in 1921 and 1949.

PORTLAND CEMENT ASSOCIATION

Dept. 5d-17, 33 W. Grand Ave., Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

South Federal Place, paved in 1934. Photos taken in 1934 and 1949.

New roads for Colombia—The department of Cundinamarca, Colombia, soon will start a 5-year highway paving program to cost about $20,000,000. Plans now being studied by Governor Jorge Leyva and a committee of financial authorities, provide for the paving of 317 miles of roads, one-fifth with asphalt and four-fifths with concrete. A million dollars worth of new equipment will be needed, and it is said that the Export-Import Bank has approved provisionally a loan in that amount and for that purpose. Christian & Neilsen Co., of Denmark, is engineering advisors, and paving will be done by Colombian affiliates of Winston Bros., Morrison-Knudsen Co., and the Utah Construction Co.

Puerto Rican housing and works—A group of 12 corporations, headed by former Governor J. T. Pinero, will start a $35,000,000 program of private dwelling construction in San Juan, Ponce, Rio Piedras, and Mayaguez, chief cities of Puerto Rico. The first construction will be a 12-story apartment house in each of those cities. In San Juan, the structure will have 312 apartments and cost about $2,500,000. The builder is the Long Construction Co. Plans have been approved by the FHA. In the meantime, the insular legislature has approved a bill authorizing a bond issue of $15,000,000 to finance roads, bridges, hospitals, schools, airports, seaports and rural water systems.

Hollow box girders in Indonesia—From far-off Indonesia comes word that the engineers of that country support the conclusions of Homer M. Hadley as to the advantages of long concrete girders built as hollow boxes, which were presented by Mr. Hadley in the 75th anniversary number of Engineering News-Record (ENR Sept. 1, 1949, p. 168). In 1936, R. M. Sedjatmo of the Irrigation Division, Ministry of Communications, Jacatta, Java, designed and built two aqueduct structures as hollow box girders. These girders had inside dimensions of 2 ft 9 in. by 3 ft 3 in. deep. There were five 46-ft spans in one bridge and three in the other. The shells were of extremely thin reinforced concrete (8 cm, or about 3¼ in.), which necessitated coating the inner surface with asphalt to make the concrete watertight. Mr. Sedjatmo distributed his tension steel uniformly across the full width of the bottom slab, concluding that such an arrangement is preferable to concentrating the steel close to the webs. This checks Mr. Hadley's conclusions as to the best distribution of the steel.

Contractor saves penalty of $500 —by investing $3.84 in Air Express

Time clause in housing project paving contract stood good chance of being invoked when equipment broke down at 5 P.M. So 10-lb carton of replacement parts was Air Expressed from 1200 miles away. Delivered in just 8 hours. The Air Express charge was only $3.84—and contractor completed job on time.

$3.84 is small indeed, since it covers door-to-door service. Anytime delivery, 7 days a week. Makes the *world's fastest* shipping service the most convenient.

Air Express goes by Scheduled Airlines; extra dependability, *experienced* handling. Shipments keep moving. Regular use keeps *any* business moving.

Air Express gives you all these advantages

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Special door-to-door service at no extra cost.
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1150 cities served direct by air; air-rail to 22,000 off-airline offices.
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Because of these advantages, regular use of Air Express pays. It's your best air shipping buy. For fastest shipping action, phone Air Express Division, Railway Express Agency. (Many low commodity rates in effect. Investigate.)

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Rates include pick-up and delivery door to door in all principal towns and cities

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LIKE THESE

30% Harder Surface
40-100% Better Bond to Steel and Aggregate
20% Higher Flexural Strength
80% Higher Resistance to Injurious Solutions
18% Lower Shrinkage
Higher Resistance to Cracking and Crazing
Higher Resistance to Water Corrosion, Erosion and Abrasion
plus
Greater Workability, Controlled Set, Faster Placing, Better Finishing

Send for this new book Today . . .

Lists illustrated information and performance data on PLASTIMENT-CONCRETE . . . its greater workability, its greater field economy, its superior results, and its extra durability factors for jobs which require your guarantee. Discusses 14 additional materials of construction, engineered for coating, sealing, hardening and repair work on concrete and masonry. Complete with product descriptions and composition, specific uses, contributing properties and Architect's Specifications. To obtain your free copy, write today or use the coupon below.

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Results obtained with PLASTIMENT-CONCRETE, taken from test reports and records of U. S. ENGINEER CORPS, PUBLIC ROADS ADMINISTRATION, SMITH EMERY COMPANY, and other independent laboratories, confirmed by performance records on worldwide installations totaling millions of cubic yards of concrete. PLASTIMENT and other Sika products have been tested and approved on Federal, State and Municipal projects and are approved under Building Codes of principal cities.

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MUNICIPAL AFFAIRS

A PRAIRIE METROPOLIS—Here's an aerial view of Edmonton, looking east down Jasper Avenue through the heart of the business section. In the background is the Macdonald Hotel, to which 300 rooms are now being added by the Canadian National Railways.—R.C.A.F. photo.

Canada's northernmost city also the fastest growing

Since 1941, the population of Edmonton, capital of the province of Alberta, has jumped from 91,000 to 150,000. It is not only Canada's northernmost city, it is also the fastest growing city in the Dominion.

Following the discovery of oil at nearby Leduc three years ago, Edmonton has become the petroleum center of the Dominion. In the last few years 64 new businesses related to that industry have been established in the city. A $10,000,000 United States war-surplus refinery in Yukon was hauled, piece by piece, 1,000 miles down the Alaska Highway and reassembled there.

Situated in the midst of a vast prairie on the banks of the North Saskatchewan River, Edmonton was founded in 1871 near the site of the post established in 1795 at North Edmonton by the Hudson's Bay Company.

During the Klondike gold strike of 1898, Edmonton was the starting point of the overland route to the north. In 1904 the thriving community became a city and two years later was made the capital of the newly formed province of Alberta. Soon came the railways, then the war, the Alaska Highway and the 537 mile Canol pipe line, all adding to the importance of the city. Last year Edmonton had a $40,000,000 housing program, and city land values have doubled recently.

In Edmonton there is public ownership of the telephone and transporting systems, as well as of the water, light and power plants.

Baltimore improvements $47,000,000 this year

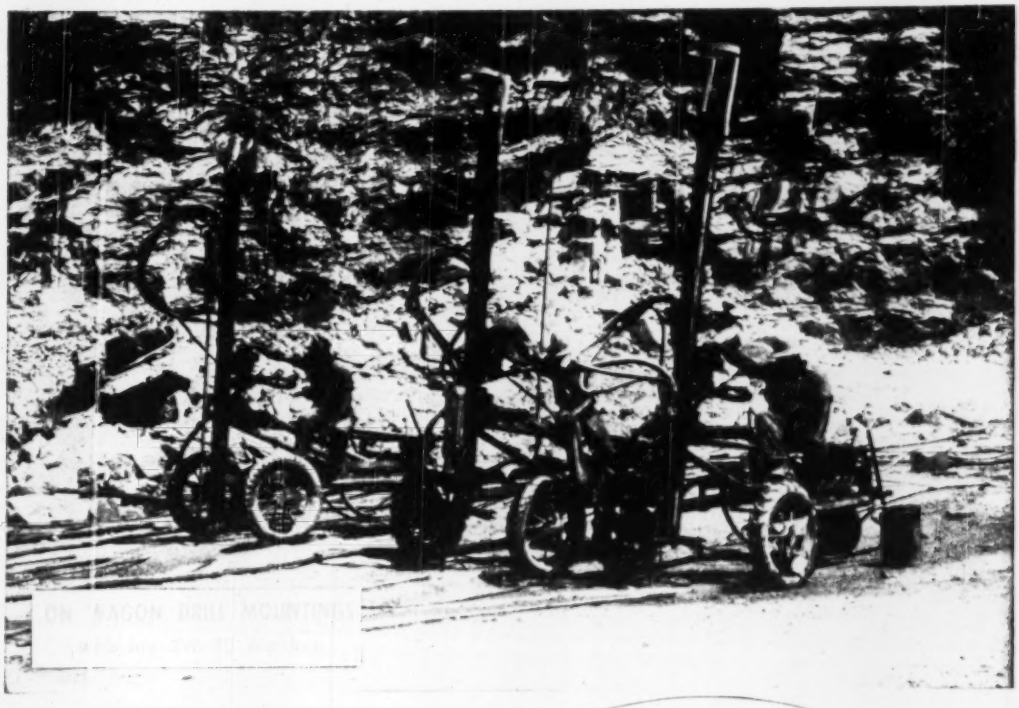
Public improvement projects totaling about $47,000,000 will be completed by Baltimore, Md., this year, according to a progress report issued by Mayor Thomas D'Alesandro.

All of the projects are old ones on which construction was begun last year or the year before. They range from completion of the Patapsco-Montebello water tunnel to concrete paving projects.

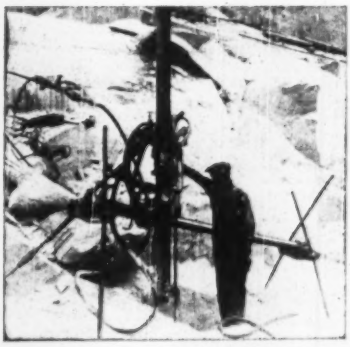
Improvements which Mayor D'Alesandro estimated will be finished this year are:

1. Water supply improvements costing about $21,000,000 for construction of the Patapsco-Montebello water tunnel, filtering stations and smaller projects.
2. Concrete paving projects totaling $4,700,000.
3. Other paving projects totaling $3,200,000.
4. Bridge and freeway construction, $2,400,000.
5. Sewer improvements, about $4,000,000.
6. Public buildings, $8,000,000.
7. Miscellaneous construction, about $4,000,000.

(Continued on page 63)



Put JOY SILVER STREAK DRIFTERS TO WORK ON YOUR JOB—



Watch daily footage *INCREASE* and costs per foot go *DOWN*!

JOY Silver Streak Drifters feature the exclusive *Dual Valve* with positive cushion control. It gives a harder, more powerful punch—literally makes air do more work. What's more, JOY Drifters *last longer*—give you more feet of hole with less maintenance. Exclusive *cadmium plating*, inside and out, inhibits rust, prevents scoring during run-in, and at the same time, adds power by permitting closer piston tolerances. ● Ask for a trial demonstration on JOY Drifters—the T-300, T-350 or T-400—*prove their all-around superiority right on the job!*

Write for Bulletin, or

Consult a Joy Engineer

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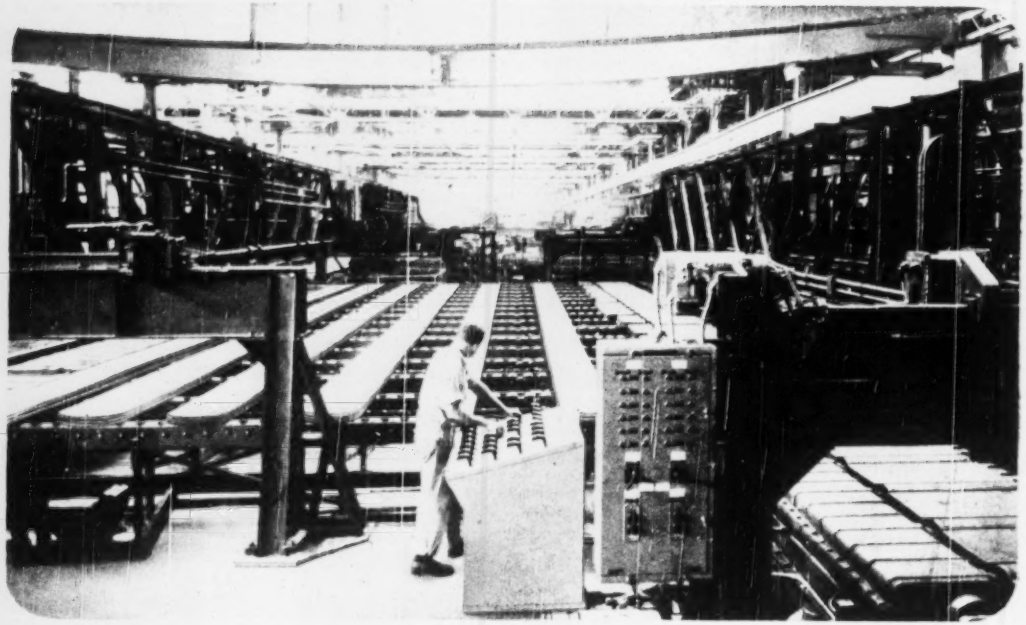
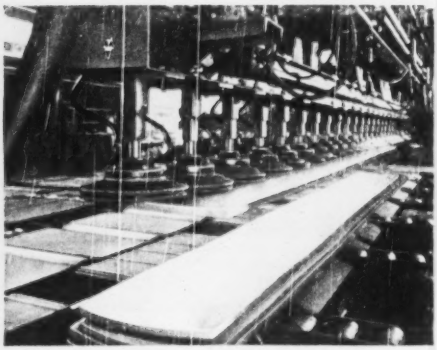


TO BUILD OR NOT TO BUILD



The smaller illustration is of the vacuum cup handling equipment operating in conjunction with the 2-Hi Cold Rolling Mill. Because of the massive size and weight of individual brass bars, all handling is mechanical.

This Mill, designed and constructed by Stone & Webster Engineering Corporation, is capable of producing the heaviest non-welded coils of strip brass, and includes the largest cold breaking-down mill in America.

For Scovill Manufacturing Company, Stone & Webster Engineering Corporation carried on continuing studies of the client's production operations over a period of four years. Analysis was made of production pattern for anticipated requirements, with costs of production in proposed mills compared with costs in the existing plant.

Companies today, faced with improving production facilities or lowering cost of plant operation, find comprehensive engineering reports by Stone & Webster Engineering Corporation valuable in developing sound, long range production plans.

STONE & WEBSTER ENGINEERING CORPORATION

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Dallas traffic survey is being planned

At a meeting of the City Plan Commission of Dallas, Tex., Traffic Engineer Lloyd M. Bratt announced that the city would seek state and federal help in making a complete parking and traffic survey. The cost will be about $120,000. Dallas will bear one-fourth of the cost while the Texas State Highway Department will be asked to bear a fourth and the Federal Bureau of Public Roads half of the cost.

It is planned to interview every driver who parks in a downtown area. He will be asked where he came from, the object of his trip, how long he parks, and where he is going from there. This information will show how great the demand is for parking in every part of the downtown area.

In the traffic survey, a cross-section census is planned of where Dallas people go when they leave their homes, and every driver entering or leaving the city on the highway entrances would be asked where he came from and his destination. Bratt said the information obtained would show where traffic problems exist and the most desirable locations for future expressways.

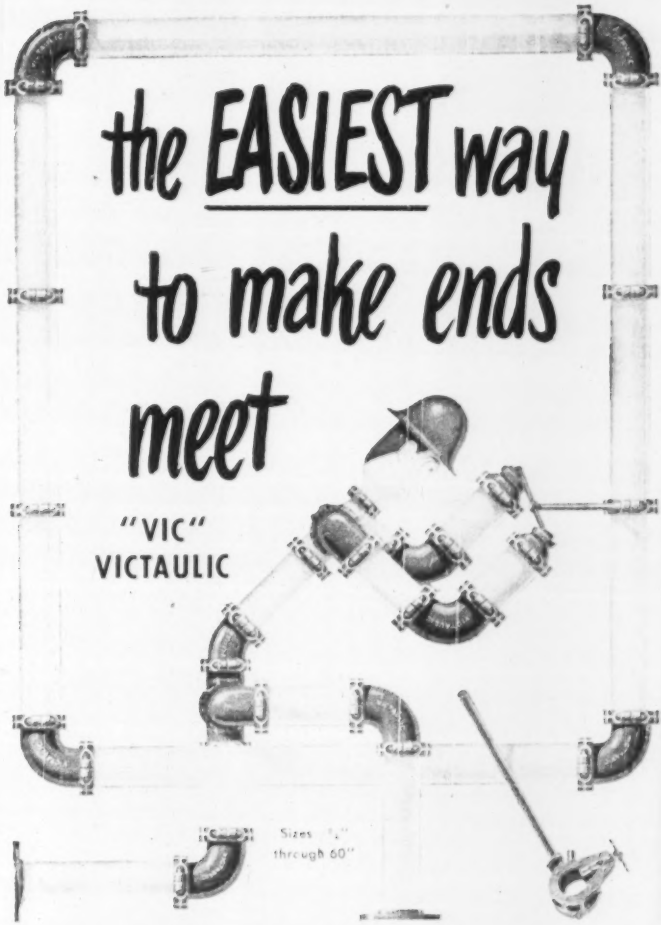
Much municipal planning under way in New Jersey

More than 300 of New Jersey's 566 municipalities have some kind of planning or zoning activity, Herbert H. Smith reports in a quarterly publication of the Department of Conservation and Economic Development.

A recent survey shows that there were seven county and 192 municipal boards legally established, 23 unofficial groups of community advisers and 300 municipalities with zoning ordinances.

Until recently, says Smith, most of the planning activity was in the larger municipalities. He said that an encouraging sign for the future is that planning and zoning now is being undertaken in Hunterdon County and some of the rural South Jersey areas where it will precede the intensive development of those sections.

Tulsa's first need—Mayor Roy Lindry, of Tulsa, Okla., says that the most pressing civic need there is a sewage disposal plant. He declared that project should have priority over any proposed civic center, as the present outfall system into the Arkansas River has been condemned by the state health department.



Even on the toughest piping jobs VICTAULIC Couplings, Victaulic Full-Flow Elbows, Tees and other Fittings will make joining those pipe ends quick, easy, and economical—assure you a leak-tight piping job!

You save every way when you *join up* with "Vic"—a simple two-bolt design gives quick, easy hookups, a standard T-Wrench is the only tool needed for connections . . . joints are positive-locked, leak proof, will stand up under extreme pressure, vacuum, or strain conditions.

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The COMPLETE Victaulic Line *can't be beat* for efficient, dependable, on-the-job piping construction. Yes Sir! Victaulic IS the Easiest Way to Make Ends Meet. JOIN UP WITH "VIC"—make your next piping job ALL VICTAULIC. Write today for these two:

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26TH VICTAULIC YEAR

The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

EDUCATION and RESEARCH

DISTINGUISHED VISITORS—W. Abbott, right, engineering advisor to the British Ministry of Education, and Sir Arthur Fleming, center, research director of Metropolitan Vickers, England, inspected research projects at the New York University college of engineering recently. Above A. A. Wartam, left, of N.Y.U. explains a cone penetrometer used to determine the supporting value of soils.

Field training courses for public sanitarians

Announcement is made of the following Public Health Service field training courses for public health workers.

Environmental Sanitation Field Training for Graduate Sanitarians, New England Field Training Center, Amherst, Mass., July 10-Sept. 1.

The same, at the Topeka Center, Topeka, Kan., Aug. 21-Nov. 11.

Field Survey and Evaluation Methods for Measuring Quality of Housing Environment, Atlanta Center, Atlanta, Ga., Aug. 7-12.

The same, Syracuse Center, Syracuse, N. Y., Aug. 21-26.

Insect and Rodent Control Training for Foreign Public Health Personnel, Atlanta Center, Atlanta, Ga., July 5-18 and July 31-Aug. 11.

More housing research

In addition to the housing research projects previously outlined (ENR April 13, page 574 and May 4, page 710) agreements on another group of studies to produce data for better and lower-cost housing have been announced by the Housing and Home Finance Agency.

These projects will be conducted by the National Bureau of Standards, U. S. Weather Bureau, Department of Agriculture and the University of Toledo. They include the following investigations: Strength of light gage tubular metal columns for supports in dwellings; designs of roofs for snow load in various sections of the country; serviceability of flashing materials in dwelling construction; effectiveness of paint vapor barriers after cleaning and washing with various types of cleaning agents; effectiveness of methods of construction to prevent termite attack; efficiency of soil cover materials as vapor barriers under basementless houses; and evaluation of results of concrete blocks when cured under four methods commonly used.

Commitments made by the HHFA for these seven projects total $22,700.

Educational Notes

Advanced structural theory. A graduate course in advanced structural theory is being offered by the Pennsylvania State College at its Harrisburg center. It is given for practicing engineers in that area. Instructor is J. P. Fielsch, bridge engineer of the Philadelphia Department of Public Works, who is planning the course around practical design techniques employed on the Pennsylvania Turnpike bridges and in industrial structures.

Waterworks operators' school. The North Carolina Water Works Operators' School will be conducted in Chapel Hill June 4-9. Sponsored by the North Carolina Water Works Operators' Association with the North Carolina Section of the American Water Works Association, the school will be conducted by the Institute of Government in cooperation with the School of Public Health of the University of North Carolina. The school will be open to residents of neighboring states also.

Opportunity for engineers. Dean E. D. Smith of Iowa State College says: "At the moment there is a temporary minor surplus of engineers in the United States but this will pass very quickly. In a few years, in all phases of engineering, there will be far more jobs than engineers to fill them. If the present trend continues, at no time in the next 15 years will there be enough graduates to meet the demand."

Technical drawing. Illinois Institute of Technology this summer will give a program leading to a bachelor of science degree in technical drawing—the first degree granting program in this specialized field. The curriculum will provide engineering fundamentals and professional training in the fields of technical drawing and education. It will include advanced courses in mechanisms, machine design, architectural drafting, industrial design, production illustration, structural drafting, topographic drafting, and advanced descriptive geometry. Basic courses will include economics, mathematics, chemistry, English, physics, psychology, and fundamental drafting.

New engineering building. Norwich University alumni have raised one-third of the $300,000 fund needed to build a new engineering building on the campus at Northfield, Vt.

Summer session. Chester A. Arents, assistant dean of engineering, has been named director of the 9-week summer session of the Illinois Institute of Technology, June 15-Aug. 18. More than 135 undergraduate courses for both undergraduate and graduate students will be offered in 17 fields of study in engineering, design, the natural sciences, and certain areas of the social sciences and humanities. Thirty-two courses in 12 fields will be offered for graduate students only.

Industrial wastes conference. A 3-day New England industrial wastes conference, June 26-28, will be a feature of the summer session at the Massachusetts Institute of Technology. The department of civil and sanitary engineering will be joint sponsor with the New England Council and the New England Sewage Works Association. Professors Rolf Eliassen and Clair N. Sawyer will represent the M.I.T. sanitary engineering laboratories.

Cemesto* builds *insulated* roof decks *fast* and *at low cost!*

1 Cemesto Panels stacked for quick, economical application to roof deck. Magnetic Winding Company, Easton, Pa.

2 Caulking joints between Cemesto Panels. Smooth surface makes ideal roofing base. Carolina Asbestos Co., Marshville, N. C.

3 Cemesto Panel deck, weather stripped. All panel edges weather sealed at factory. Magnetic Winding Co., Easton, Pa.

4 Roof deck of Cemesto Panels mopped for application of asphalt roll roofing. Pittsfield Twp. School, Washtenaw Co., Mich.

Cemesto, World's Most Versatile Building Material, combines amazing structural strength, high insulation value, interior and exterior finish – all in a single fire-resistant panel that's quick and easy to apply!

No other building material gives you all the advantages of Cemesto Insulating Structural Panels for fast, low cost construction of roof decks, as well as curtain walls and partitions. For no other combines all the remarkable properties of this modern building material.

Strong, rigid, pre-formed Cemesto Panels are made of Celotex cane fibre insulation to which cement-asbestos facing is bonded on both sides by a highly vapor-resistant adhesive. They are lighter than most building materials, yet have the structural strength to carry the roof load with a high margin of safety. And their cane fibre core is protected against fungus, spoilage and dry rot by the exclusive patented Ferox* Process.

Cemesto Panels Insulate As They Build

With one trade, with Cemesto Panels, you do more than speed the work and cut costs. You also provide effective, permanent insulation. Cemesto Panels are the ideal insulating base for all types of roofing. Their smooth, hard, non-combustible, stone-grey surfaces have a light reflection value of 58% – and provide both interior and exterior finish. Left unfinished, they never need maintenance. Can be worked with ordinary tools on the job, or precut at the mill for faster application. Quickly, easily attached to steel framing with metal clips or to wood framing or wood members with nails.

Cemesto Panels Are Amazingly Versatile

Cemesto Panels make possible many important economies in the design, construction and maintenance of every type building – from modest home to giant industrial plant. Almost 20 years of varied use in all climates, all over the world, prove their reliability and permanence. Discover how they can help you build better, faster and at lower cost! Mail coupon below for complete information.

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MAKES P&H YOUR BEST BUY

MORE POWER AT THE TOOTH POINT

Your shovel's work capacity is limited by the maximum power the machine can exert at the dipper teeth without losing its stability. Because P&H gives you greater stability (without excess deadweight) you have more digging power at the tooth point. This gives you more work capacity —faster cycles at maximum loads—lower costs. Get the proof before you buy your next excavator.

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MORE ON THE HOOK—AND FASTER HANDLING

In crane service, P&H stability is still more obvious. Lower center of gravity and better weight distribution give you the highest ratio of lifting capacity in relation to gross weight. You can put more on the hook — handle it faster — and safer. Try it!

AND STILL MORE P&H ADDED VALUES

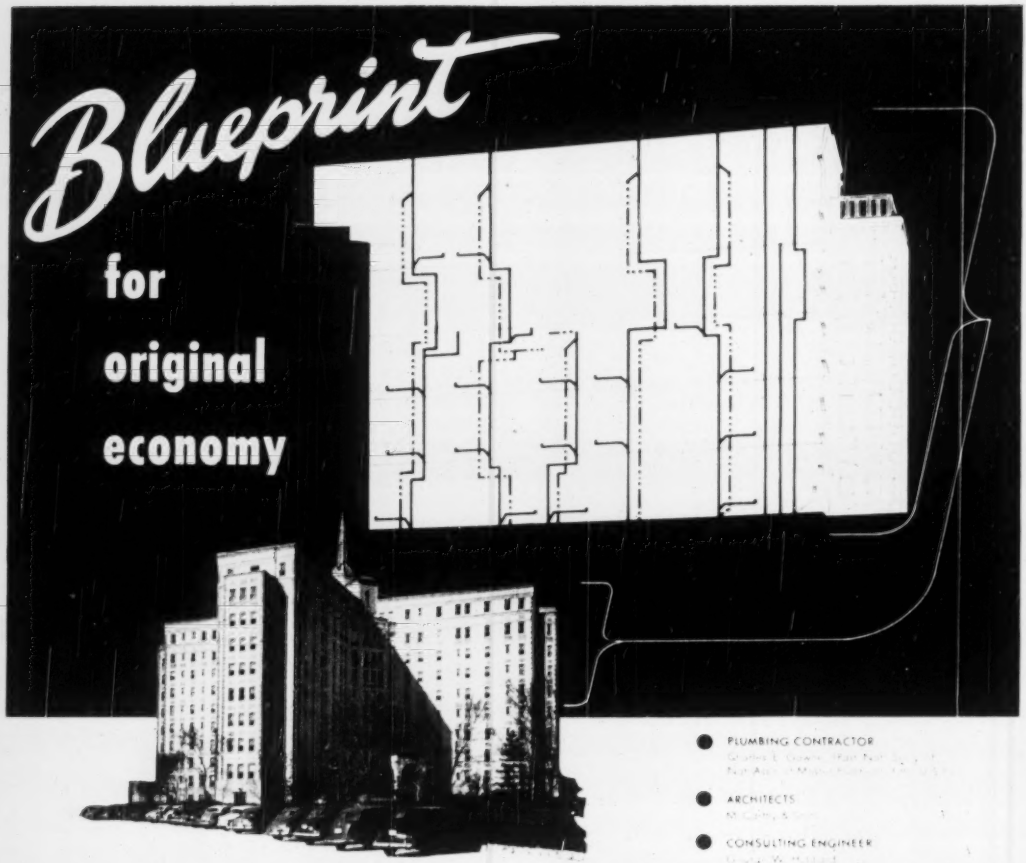
1. All welded construction of rolled alloy steels . . . originated by P&H . . . more highly developed by P&H.
2. True tractor-type crawlers, most efficient traction on any excavator. You can make sharp or gradual turns.
3. Low pressure hydraulic control is smoother . . . more responsive . . . easier on both operator and machine.
4. Rapid reversing planetary chain crowd gives you faster, more positive bite. Crowd chain outlasts 20 to 50 crowd cables.
5. Simpler design gives you an easier machine to work on . . . simplifies maintenance . . . reduces lay-up time . . . cuts costs.

Only P&H gives you these Added Value features and at no extra cost

ASK YOUR P&H DEALER

P&H Excavators and Truck Cranes are more easily converted for the various types of service shown below — with hoist and digging drums on one shaft, the need for auxiliary shafts and gearing is eliminated. You also have a choice of gas, Diesel or electric power. Ask for literature on the size you need.

Blueprint for original economy



- PLUMBING CONTRACTOR
- ARCHITECTS
- CONSULTING ENGINEER

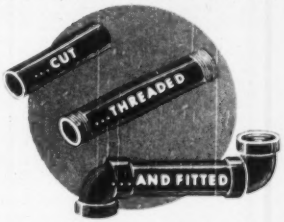
The schematic drawing outlines part of the 4,000 feet of pipe installed in the five floors added on top of the Little Company of Mary Hospital, Evergreen Park, Illinois. Developed from the original plumbing riser diagram, this drawing shows 5 of the 6 soil, waste and vent stacks, and 3 of the 5 downspouts in the S. E. Wing. Corrosion-proof Clow "IPS" (threaded) Cast Iron Pipe was chosen for this installation because it assures a century or more of service.

The plumbing contractor, Charles E. Gawne, was forced to replace many of the old vent stacks in the original building. Of ordinary pipe, these stacks were no longer serviceable due to corrosion. Their replacement would not have been necessary if Clow "IPS" Pipe had been used.

Clow "IPS" Cast Iron Pipe is available with plain or threaded ends, in 3, 4, 5, 6 and 8" sizes in 18' random lengths. Also furnished with integral caulking bell on one end (other end plain) in 18' random lengths and 4, 6 and 8" sizes.

"IPS" is iron pipe size O. D.

CLOW "IPS" CAST IRON PIPE CAN BE



on the job, with ordinary tools of the piping trade.

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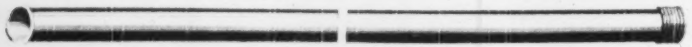


and their National Cast Iron Pipe Division, Birmingham, Alabama; subsidiaries Eddy Valve Co., Waterford, New York; Iowa Valve Co., Oskaloosa, Iowa.

MEN AND JOBS

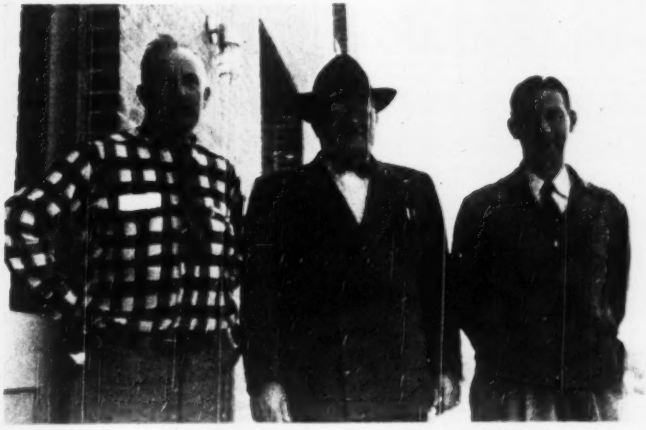
Promotion of **Ray J. Lyman** to project manager for the Encinecate, N. M., Irrigation Project has been announced by H. E. Robbins, regional director of the U. S. Bureau of Reclamation, Amarillo, Tex. Construction of the 43,000-acre project was completed recently by the bureau. Mr. Lyman had served on the project since 1947, first as project superintendent. Later he became acting project engineer in charge of construction. For three years previously, he had been head of the bureau's regional development program in the five-state area served by the Amarillo office. A graduate engineering student of the University of California, with additional engineering work at the University of Idaho and George Washington University, Mr. Lyman has been in western reclamation work since 1930. During the war he was assigned to the U. S. Navy's Bureau of Ships.

Leo E. Donovan, division engineer of the Springfield division of the Illinois Central R.R., has been appointed to a similar position at Paducah, Ky. He will be succeeded at Clinton, Ill., by **Frank Kraft**.

Howard E. Eckerlin has opened new offices as consulting civil and structural engineer at 100 Stafford Ave., Syracuse 6, N. Y.

Southeastern Construction Co. of Charlotte, N. C., has reopened its Atlanta, Ga., office in charge of **Frank J. Sharpe**. It is at 690 Kennesaw Ave.

Pictured during a recent Galveston district safety conference are, left to right, Nathaniel Jensen, district safety engineer; Lt. Col. Ellsworth L. Davis, district engineer; Kenneth Smith, chief of the district construction division; and S. S. Elkins, safety engineer for the Southwestern division for the Corps of Engineers.



Inspecting the new $825,000 3-mgd water-treatment for Chapel Hill, N. C., recently were (l to r): Harry E. Garnand, construction superintendent A. H. Guion Co., Charlotte; Carl W. Mengel, chief engineer for W. C. Olsen, consulting engineer, Raleigh and Max D. Saunders, plant operator.

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WEINMAN PUMP

You can put complete reliance on what your WEINMAN representative tells you about your pumping requirements. His recommendations are based on years of "shirt sleeve" engineering experience in applied hydraulics. They are backed by an organization where every key man has at least 25 years of concentrated experience with one product—PUMPS. His recommendations are free for the asking and you incur no obligation. Just write, wire or phone.

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The WEINMAN Unipump

For use where space is limited . . . may be mounted in any position . . . very compact. Capacities 10 to 1000 G.P.M. Heads to 500 feet. For informative bulletin on UNIPUMPS, fill out the coupon below.

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I would like to learn more about WEINMAN Unipumps. Send Bulletin 226-F to:

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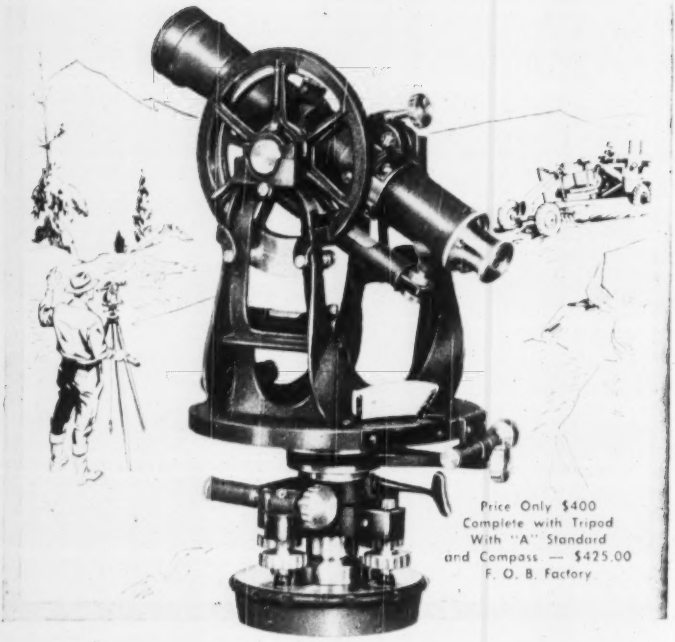

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Complete with Tripod
With "A" Standard
and Compass — $425.00
F. O. B. Factory

The David White Western Precise Preliminary Transit gives you wide Versatility for Engineering and Surveying

WHY do you need this instrument? Because, no other instrument gives you the precision, the easy, fast working facilities for a variety of engineering and survey work at so low a cost.

Telescope 9-1/4" long, dust and dirt free internal focusing — coated optics — erecting eyepiece and a magnifying power of 20 diameters. Horizontal Limb 5-5/16" Dia. with 1 Double Vernier Reading to single minutes. Vertical Circle 4" Dia. with guard. It can be used equally well on long distance or close work.

If you're in the market for a new preliminary precise transit, investigate the David White Model No. 7064 illustrated above. Compare its many features and its price with all others. You'll like what you find out! See our nearest dealer or write direct. Free Bulletin No. 1050 will give you complete details on this and David White's complete line of fine engineering instruments. David White Co., 515 W. Court St., Milwaukee 12, Wisconsin.

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We offer complete, prompt repair service on all makes of instruments — levels, transits, theodolites, etc.

N. J. The company also has offices at Charleston, W. Va., and Richmond, Va.

Lt. Col. John W. Miles, resident engineer at Detroit Dam, Corps of Engineers project in western Oregon, has been transferred to Okinawa for duty with the 20th Air Force. He will be replaced at the Detroit project by **Clarence C. Davis**, civilian engineer, who has been on active duty in the Corps of Engineers Reserve at Boston.

Gerald J. Fitzgerald has resigned as public works commissioner of Utica, N. Y. He had held that position from Jan. 1, 1946, until late in May of last year, when he resigned to become general superintendent of Midstate Builders, Inc. He returned to the post of commissioner on a temporary basis last Jan. 1 as successor to James Jones. A successor to Mr. Fitzgerald will be named soon.

Justus B. Naylor of Lewes, Del., has become Sussex County division engineer of the Delaware State Highway Department, succeeding **Edward V. Rose**. A former Army engineer, he is head of the Delmarva Maintenance and Construction Co. He is a reserve officer major in the U. S. Army Corps of Engineers. He went on active duty in the corps in 1941, and was released in August, 1948. He formerly served as construction engineer at DuPont Co. plants at Seaford, Del., Memphis, Tenn., and Charleston, Ind.

The Idaho Bureau of Highways, which formerly was a part of the State Public Works Department, now has become a separate department with **James Reid**, former head of the Bureau of Highways, chief engineer. **John R. McKinney**, public works commissioner since early last year, heads the department, created by the state legislature.

Thomas H. Dobbin, lately of Niagara Falls, Ont., has been named assistant engineer in the works department of St. John, N.B. He is a graduate of the University of New Brunswick engineering school, and served overseas with the Royal Canadian Engineers.

Leonard P. Schafer has been appointed corrosion engineer of the Hinchman Corp., Francis Palms Bldg., Detroit, Mich. Hinchman makes leakage surveys of underground utilities and gives corrosion mitigation services.

Charles W. Kestner, Virginia State Highway Department personnel engineer, has taken over the Culpeper highway construction district, succeed-

EIMCO 104 RockerShovel

For loading rock, sand, gravel, ore concentrates or other materials, it's the 104 RockerShovel! This revolutionary new type of loading equipment is new only in the economy it provides contractors with material handling and loading problems.

The RockerShovel principle is not new — contractors who have had underground jobs are familiar with the sturdy underground models of RockerShovels, and many of them who now operate the 104 crawler mounted machine say, "This is the machine we've been waiting for."

The 104 loads at the rate of 5 yards per minute in rock or 8 yards per minute in sand and gravel using a 1¼ or 2 yard bucket respectively.

Furnished with a 48 HP Diesel engine or 30 HP Electric motor the 104 is ready to go when delivered to your property.

Eimco 104 RockerShovel is a heavy-duty machine for the toughest kind of loading jobs. See how one contractor licked his sand and gravel job — write for bulletin L1021, or see your Caterpillar Dealer.

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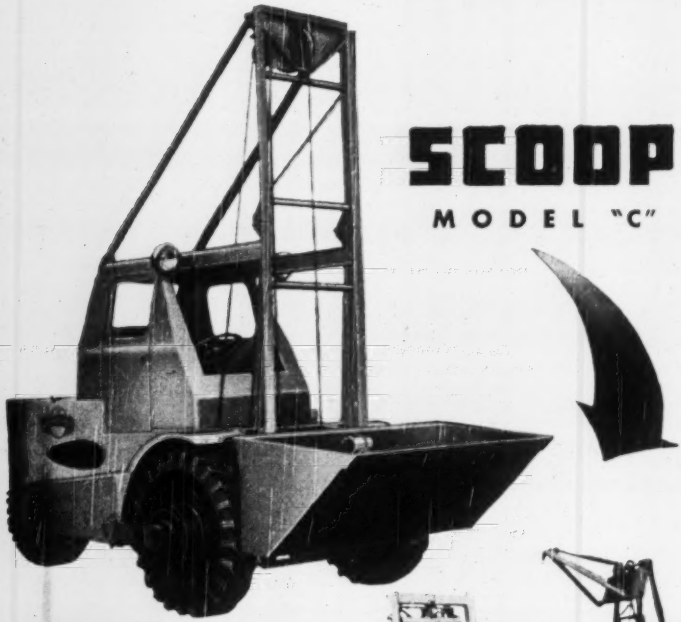
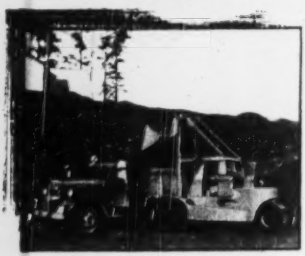
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

VERSATILE PROFIT-MAKER



SCOOP
MODEL "C"



Loading is easier, more practical. High ground clearance and shorter turning radius.

Lifts 4,000 pounds. Hoisting power is taken from the front of the engine to permit uninterrupted hoisting.

LIFT FORK

CRANE BOOM

CONCRETE HOPPER

FERTILIZER FORK

One machine—6 jobs

Built at the request of contractors, the Wagnermobile Scoop Model "C" saves time, labor costs by its many efficient uses.

- Transports, elevates and pours concrete.
- Shovels and loads dirt, etc.
- Lifts and stacks lumber and other materials.
- Handles fertilizer, hay and straw.
- Lifts heavy equipment.
- Reaches extra height.

Attachments:

- ¾ cubic yard concrete hopper.
- Scoops in 5 sizes.
- Lift fork with 2, 3 or 4 prongs.
- Special fork with tines for fertilizer, or hay.
- Crane boom.
- Track extensions up to a total of 26 ft.

These six attachments, quickly changed mean profit on the job. Wagnermobile Scoop helps you complete contracts faster.

Hydraulic controls.
Power steering-maneuverability.
Planetary drive—more power.
4 speeds forward, 4 speeds back.

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George B. Finley, formerly of the Texas State Highway Department, has been appointed district engineer in charge of the new Austin, Tex., office of The Asphalt Institute, under the supervision of Hugh A. Wallace, newly promoted to division engineer at Dallas. Mr. Finley is a civil engineer graduate of the University of Texas, and has done railroad engineering work in Texas and Louisiana.

ing **D. L. Mount**, transferred to the Fredericksburg district. Mr. Kestner will administer some 6,275 miles of roads in Albemarle, Arlington, Culpeper, Fairfax, Fauquier, Fluvanna, Green, Louisa, Loudoun, Madison, Orange, Price William and Rappahannock counties.

Sidney Hogg has been appointed managing director of Western Bridge and Steel Fabricators Ltd. at Vancouver, B. C. Previously he was chief engineer.

Harry C. Anderson, chief engineer and chairman of the Highway Board of British Columbia, is retiring to become general manager of the General Construction Co. and its subsidiaries. Well-known in the Fraser Valley, where he was district engineer for years, Mr. Anderson came to the top of the works department in 1947, just as British Columbia launched its big road rebuilding program.

Arthur J. Inerfield has been made assistant to Col. Joseph S. Gorlinski, executive officer of the California Regional Water Pollution Control Board. He is a sanitation engineer formerly with the state department of public health.

G. G. Part, town engineer of Vermilion, Alta., has been appointed City Manager and Engineer of Drumheller, Alta., succeeding Duncan M. Robertson, resigned.

Chairman for 1950 Los Angeles Chamber of Commerce construction industries committee, S. B. Barnes, right, receives gavel from retiring chairman Harry G. Haake, vice-president of Ceco Steel Products Corp. Barnes, Los Angeles structural engineer, promised continuation of committee's statewide drive for simplification and modernization of state and local building laws.

Kenneth G. Tower, hydraulic engineer with the Portland, Ore., district, Corps of Engineers, for the last ten years, has become chief of the power division of the united western investigation of the U. S. Bureau of Reclamation at Salt Lake City, Utah. The primary purpose of this division is to get more water to Los Angeles. Tower got his master of science degree in hydraulic design and laboratory research in 1934 at Penn State. During the war he did military planning for the Portland district, having to do with the layout of airfields and army cantonments and facilities. In the Portland office he had to do with hydraulic design for several important dams.

Lt. Col. Delbert B. Freeman has been named head of the newly-created Fort Worth district office of the Corps of Engineers, which will assume flood control functions formerly handled in the Galveston district office. It will have active responsibility for the eight dams in Texas now under construction, as well as for the continued investigation of the waterways of Texas on which Congress has ordered the Corps of Engineers to submit survey reports.

C. J. Kocian has been made resident engineer for the $22,500,000 Belton Dam and reservoir project near Belton, Tex., succeeding E. L. Cakal, who will still be with the project.

(Continued on page 75)

Extra Profits...

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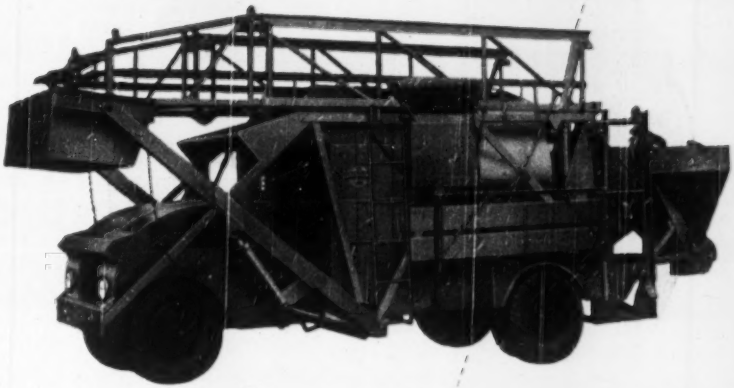
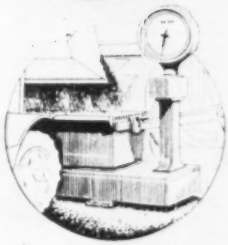
MIXERMOBILE

Model M-61





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Attached 25-ft. tower with standard 10-ft. extensions.

Saves time and labor! More jobs covered! Less Maintenance! The One-Yard Mixermobile is the most economical method of handling concrete on the job. Costs of hauling and erecting expensive equipment are eliminated. Labor costs are minimized. One man at centralized controls handles the entire operation..."sets-up" equipment ready for pouring ...then controls every operation from dump truck to deck.

The One-Yard Mixermobile can turn out 200 cu. yds. of concrete in 8 hours. Also provides valuable storage space when handling ready-mix concrete. It travels at highway speeds comparable to trucks with similar loads.

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It's no news that the true cost of wire rope cannot be reckoned by purchase price alone. As we've so often pointed out, the real cost is the cost per unit of work it does.

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Then, study your records every so often. They'll tell you, far more convincingly than we can, that Bethlehem wire rope is an *economical* rope.

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Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

Succeeding Lt. Col. F. B. Hall, Jr., Lt. Col. R. J. B. Page has taken over the duties of executive officer of the Garrison district, Corps of Engineers. He is a 1936 graduate of the Military Academy. During the war he was in Iceland for two years and was with the First Army in Europe. Prior to going to Garrison district, Colonel Page was assistant executive officer to the Chief of Engineers.

Walker R. Young, former chief engineer of the U. S. Bureau of Reclamation, is now president and treasurer of the Thompson Pipe & Steel Co., Denver, Colo., succeeding the late J. Leslie Brown.

Edmund Friedman, of Miami, Fla., and **Boris A. Bakhmeteff**, professor of civil engineering at Columbia University, have been appointed consulting engineers for the $205,000,000 central and southern Florida flood control project. Friedman was county engineer of Dade County for ten years when he became an Army engineer officer. Bakhmeteff is an international authority on fluid flow, and has pioneered in the hydraulics of open channels.

Henry M. von Oesen, city engineer at Wilmington, N. C., has resigned to engage in private engineering at Wilmington. A civil engineering graduate of North Carolina State College, he joined the city engineering department at Wilmington in 1938, and served as assistant city engineer until 1946, when he was named city engineer.

Lt. Col. G. N. Phillips has been appointed superintending engineer of Sault Ste. Marie Canal, Department of Transport, Ottawa, Can.

Seth L. Reese, Jr., recently joined the staff of National Slag Association as engineer and administrative assistant. He is a recent graduate in civil engineering, University of Maryland.

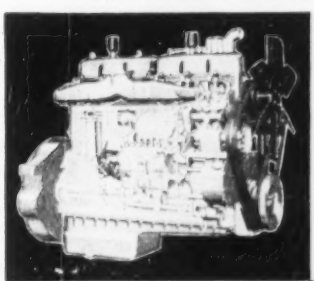
PUSHING CONCRETE... *far and fast!*

WAUKESHA *Diesel Power* *Gasoline Power...* POWER

● On this Chicago Sanitary District job they're pushing a lot of concrete. The Waukesha-powered Model 200 Double *Pumperete* pushes it far—1200-ft. horizontally, or 120-ft. straight up, as you want it. And fast!.... 50-65 cu. yds. an hour! It takes real power—Waukesha power—to shove a huge, heavy slug of concrete over a thousand feet long and eight inches in diameter through a pipeline *that fast.* It's a Waukesha Engine—Model 6-MZAU (6-cyl., 3¹⁄₄-in. x 4¹⁄₂-in., 404 cu. in. displ.) that puts the power to push behind the *Pumperete* piston.

Wherever there are pumps, or pavers, or truck mixers ... or concrete-aggregate-producing quarry or gravel pit machinery ... or general construction machinery—you'll find Waukesha Engines and Power Units.

Waukesha Diesels particularly! With that most outstanding of Diesel design features—the exclusive spherical-shaped combustion chamber! With two swirl cups in the piston crown, turbulence is controlled constantly and automatically. Burning rate speeds up or slows down, with engine speed. No complicated advance and retard mechanism in injection pump is needed.



WAUKESHA Model 148 DK DIESEL
6-cylinder, 5¼-in. x 6-in., 774 cu. in. displacement, 78 hp. maximum

Get the Diesel details in Bulletin 1507.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
NEW YORK • TULSA • LOS ANGELES

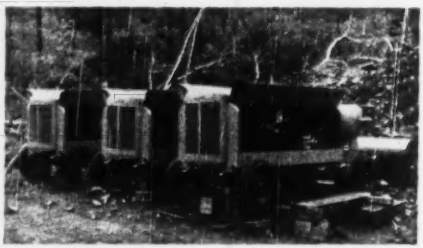
LE ROI gives you 3 ways to lower job costs

1 LE ROI AIRMASTER

Compressors that last longer on the job!

Le Roi makes both engines and compressors—has the "know-how" to build in long-life and stamina that keep costs down!

• Airmaster Compressors from 60 to 600 cfm.



2 LE ROI CLEVELAND

Rock Drills that do more on the job!

Le Roi-Cleveland rock drills are less tiring. Their high drilling speed, strong rotation, hole-cleaning power and hard-hitting efficiency make it easier to get more done.

• Sinkers, Wagon Drills, Breakers, Spades, Tampers —a size for every job

3 LE ROI SERVICE

by experienced distributors everywhere who give you prompt attention on the job!

Write for booklet on the money-saving advantages of Le Roi equipment — and for the name of your nearest Le Roi distributor.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

New York • Washington • Cleveland • Birmingham
Milwaukee • Tulsa • Butte • San Carlos

OBITUARY

Robert L. J. Wagar, Sr., 70, Bellevue, Ohio, civil engineer and surveyor, died May 5. He was president of the Homberger and Wagar Construction Co., Sandusky, for 16 years. In 1932 he became Sandusky city engineer and supervised construction of the new waterworks system there. He was appointed city manager in 1935, and went to Bellevue in 1942 as safety service director and city engineer. Under his direction the new 700,000,000 gal. waterworks reservoir was built. He was also recently employed by the Ohio Highway Department as a project engineer.

Chester Russell Gardner, 58, civil engineer in charge of inspections in the District Public Works Office, Third Naval District, New York, died in New York on April 11. A civil engineer graduate of the Massachusetts Institute of Technology in 1916, he served the Navy at the N. Y. Naval Shipyard and in the District Public Works Office for 20 years.

John Horan, 63, city engineer of Peru, Ind., died at Cleveland, Ohio, May 2.

Frederick Van Antwerp, 64, civil engineer of Seattle, Wash., died there April 28. He was graduated from Michigan State College and soon thereafter helped make the preliminary survey for the Soo Line Railroad through northern Minnesota. He worked as a civil engineer in Minneapolis, Minn., until the first world war, in which he served as a lieutenant in the Army Corps of Engineers. He moved to Seattle in 1939 as an engineer on the Lake Washington floating bridge, and stayed in the Pacific northwest to work on numerous military, industrial and public projects.

Joseph R. Barr, 63, engineer and builder, president of Barr & Barr, Inc., New York, died at Bronxville, N. Y., May 6. He was one of the builders of the Time and Life building and the British and French buildings in Rockefeller Center. Recently he had reconstructed several buildings at Cornell University, Ithaca, N. Y.

Raymond Allen Jones, 55, vice-president of the J. A. Jones Construction Co., Charlotte, N. C., and one of the three charter stockholders, died May 8, in South America. He had been assigned to inspection work in Bolivia from the headquarters in Panama City, Pa.

Developed by three years of research . . . and now refined by tens of millions of dollars' worth of new equipment!

Gulf's GREAT NEW No-Nox

DESIGNED FOR TODAY'S POWERFUL NEW ENGINES!

Today's new cars have the most powerful engines ever made. AND—

They require a super, anti-knock gasoline.

Such a gasoline is the *new* No-Nox. It was especially designed by Gulf scientists—working hand-in-hand with leading automotive engineers—to give you *maximum* performance in your new car.

With a gasoline like this great new No-Nox, you can be *sure* your new car will perform at its brilliant best.

And the new No-Nox not only gives *new* cars peak performance. It also gives new life, new pep, and stops knocks in older cars too—even many with heavily carboned engines!

So no matter what model you drive, get a tankful of the *new* No-Nox today.

See for *yourself* what a difference it makes!

Good Gulf—our famous "regular" gasoline —is now better than ever, too!

Terrific Power in Every Drop!

Gulf Oil Corporation • Gulf Refining Company

We pause to

EMPIRE STATE BUILDING The Empire State Building was fabricated by American Bridge Company in 1930. It is the tallest structure ever built, towering 1,250 above the street level—86 stories topped by a 55' penthouse section and a 150' airship mooring mast.

THE FLATIRON BUILDING The Flatiron Building, Fuller in New York City was fabricated by American Bridge Company in 1901. When completed in 1902, it was perhaps the tallest skyscraper built up to that time.

SAN FRANCISCO-OAKLAND BAY BRIDGE Completed in 1936, this is the world's greatest bridge. It is 8¼ miles between terminals, of which 4¼ miles is steel superstructure over the waters of San Francisco Bay.

A representative list of other American Bridge Company structures:

FABRICATED AND ERECTED

Athara River Bridge
Anglo-Egyptian Sudan, Africa

Blue Water Bridge
St. Clair River, Pt. Huron, Mich.

Bronx Whitestone Bridge
East River, New York

Carquinez Strait Bridge
Crockett, Calif.

Charter Oak Bridge
Conn. River, Hartford, Conn.

Delaware River Suspension Bridge
Philadelphia, Pa.

Florianopolis Bridge
Santa Catharina Is., Brazil

Henry Hudson Bridge
New York City

Huey P. Long Bridge
Miss. River, New Orleans, La.

Lake Union Bridge
Seattle, Wash.

Thousand-Islands Bridge
St. Lawrence River, N. Y.

Will Rogers Stadium
Broadmoor, Colo.

FABRICATED

Atlantic City Convention Hall
Atlantic City, N. J.

Carew Building
Cincinnati, Ohio

Chicago Post Office
Chicago, Ill.

Chrysler Building
New York City

Cleveland Municipal Stadium
Cleveland, Ohio

Grand Central Station
New York City

Outer Drive Bascule Bridges
Chicago, Ill.

Rockefeller Center—9 Buildings
New York City

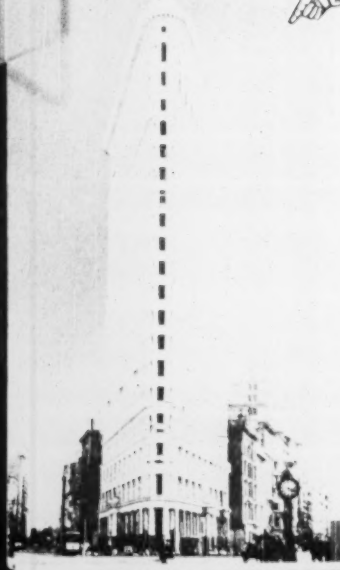
Russ Office Building
San Francisco, Calif.

Stevens Hotel
Chicago, Ill.

Wanamaker Stores
Philadelphia & New York

Woolworth Building
New York City

Yankee Stadium
Bronx, New York City



THE HELL GATE BRIDGE Completed in 1917, this bridge over the East River between Wards Island and Long Island, New York, was the largest arch span ever built up to that time.

reflect on 50 Busy Years

Come take a glance at just a few of the many jobs we have done over the past half century.

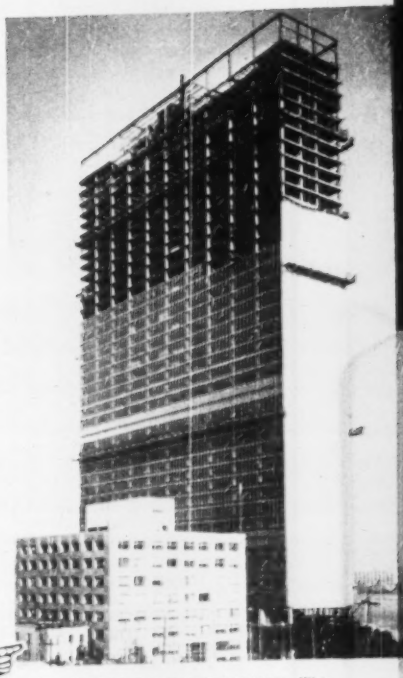
On May 12 the American Bridge Company celebrated its Fiftieth Birthday. But its structural steel experience and know-how are as old as the use of structural steel, and older. For the companies which merged in 1900 to form American Bridge Company brought with them a wealth of experience in the construction of all types of structures.

On these pages are shown but a few of the larger buildings and bridges fabricated, and in many instances, erected by American Bridge Company. Unfortunately space does not permit telling about the thousands of smaller steel structures which comprise a very important part of our Company's operations. For a more comprehensive picture, write for the booklet "Plants and Products - American Bridge Company." It is yours for the asking.

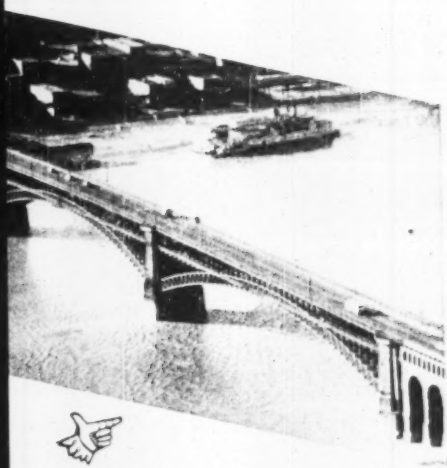
AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

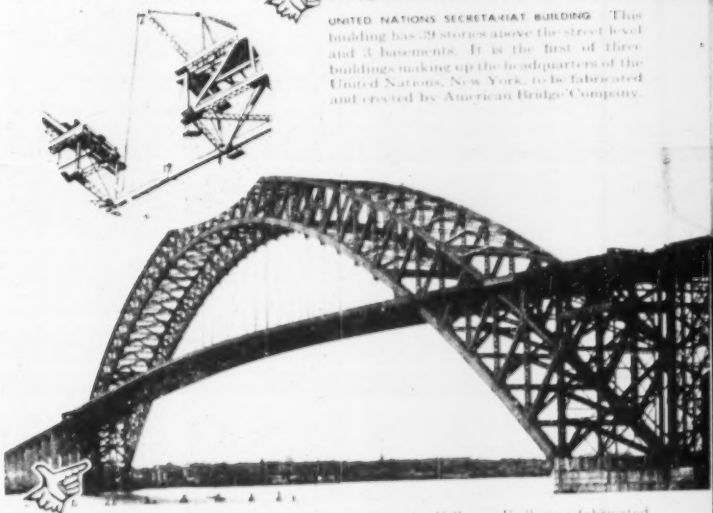
Contracting Offices in: AMBRIDGE • BALTIMORE • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DENVER
DETROIT • DULUTH • ELMIRA • GARY • MINNEAPOLIS • NEW YORK • PHILADELPHIA
PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • SAN FRANCISCO • TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



UNITED NATIONS SECRETARIAT BUILDING. This building has 39 stories above the street level and 3 basements. It is the first of three buildings making up the headquarters of the United Nations, New York, to be fabricated and erected by American Bridge Company.



EADS BRIDGE. Built in 1874, 2 miles over the Mississippi River at St. Louis, Missouri, it was the first bridge in the United States in which steel was extensively used. The Keystone Bridge Company, one of the companies in the merger to form American Bridge Company in 1900, built this bridge.

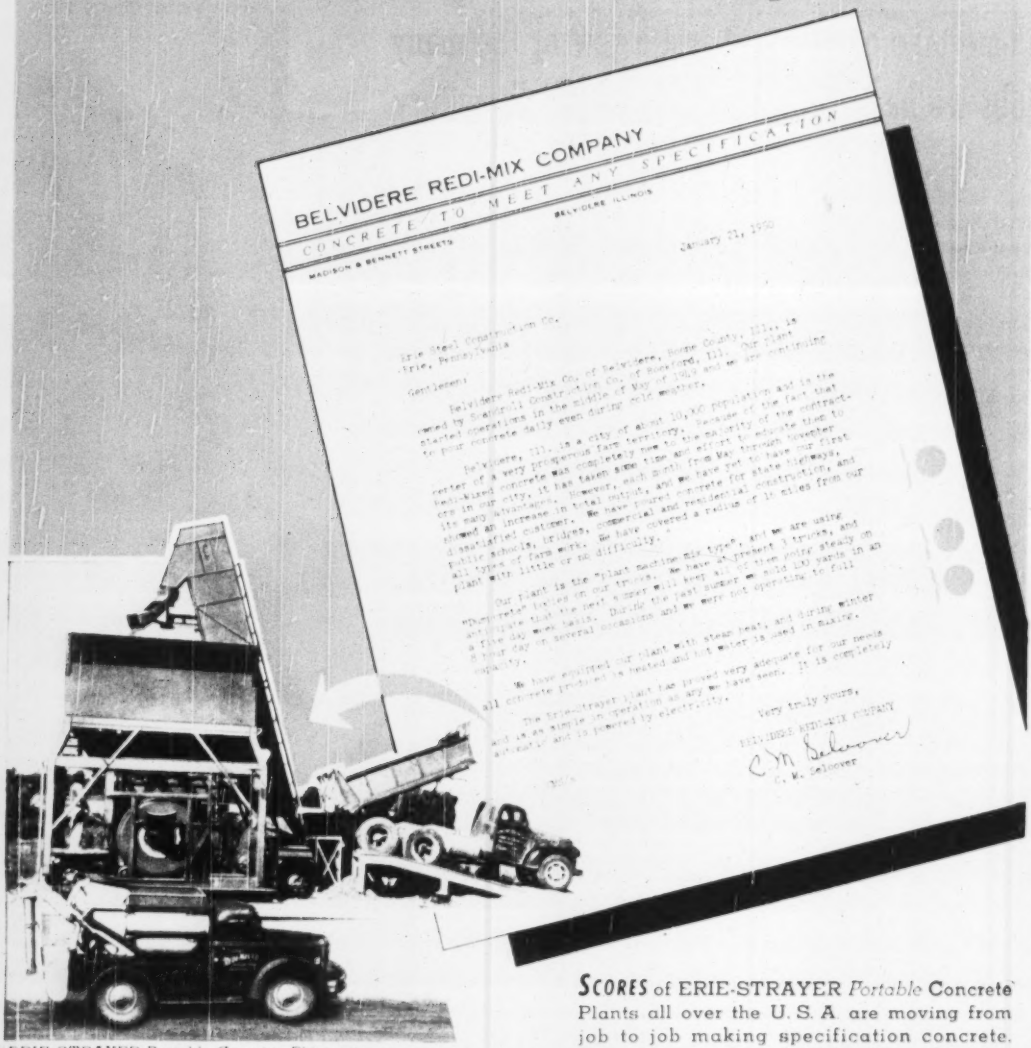


THE BAYONNE BRIDGE. The Bayonne Bridge, spanning the Kill van Kull, was fabricated and erected by American Bridge Company. It was completed in 1931. This bridge has the longest arch span in the world.

AMERICAN BRIDGE

UNITED STATES STEEL

Does Central-Mix Concrete PAY in a Town of 10,000?


BELVIDERE REDI-MIX COMPANY

CONCRETE TO MEET ANY SPECIFICATION

MADISON & BENNETT STREETS BELVIDERE, ILLINOIS

January 21, 1950

Erie Steel Construction Co.
Erie, Pennsylvania

Gentlemen:

Belvidere Redi-Mix Co. of Belvidere, Boone County, Illi. is owned by Caulfield Construction Co. of Rockford, Ill. Our plant started operations in the middle of May of 1949 and we are continuing to pour concrete daily even during cold weather.

Belvidere, Ill., is a city of about 10,000 population and is the center of a very prosperous farm territory. Because of the fact that Rockford is in our city, it has taken some time to acquaint the contractors in our city, it has taken some time and also a majority of the contractors with our concrete mix and its many advantages. However, each month from May through November showed an increase in the number of yards we have put through. We have also secured a number of state highway jobs, and have secured concrete for state highways, municipal and residential construction, and all types of farm work. We have covered a radius of 15 miles from our plant with little or no difficulty.

Our plant is the Erie Stationary mix type, and we are using a Stewart-Mack truck mixer. We have an International truck, and a Chevrolet truck for the next summer. We have been going steadily on a four day week basis. During the last summer we had two days of several occasions and we were not operating to full capacity.

We have equipped our plant with steam heat, and during winter all concrete produced is heated and hot water is used in mixing.

The Erie-Strayer plant has proved very adequate for our needs and as an example in operation as any we have seen. It is completely automatic and is powered by electricity.

Very truly yours,

BELVIDERE REDI-MIX COMPANY

C. M. Culbertson

C. M. Culbertson

ERIE-STRAYER Portable Concrete Plant set up as a permanent or central-mix plant powered by electric motor. Belvidere Redi-Mix Co., Belvidere, Ill.

SCORES of ERIE-STRAYER *Portable* Concrete Plants all over the U. S. A. are moving from job to job making specification concrete. Many are equipped with Auxiliary Concrete Bucket Hoist, which lifts a batch to forms, conveyors, truck mixers, etc. *while the next batch is mixing.* Reach out for business—make up to 40 cu. yds. of concrete per hour on the job site. Write for catalog SP-2.

ERIE

STEEL CONSTRUCTION COMPANY

105 GEIST ROAD • ERIE, PENNSYLVANIA

ELECTIONS AND ACTIVITIES

N. J. Morrisey, former assistant registrar of contractors of California, has been appointed registrar to succeed Eugene E. Ziess of San Diego, resigned. Mr. Morrisey's office is in Sacramento.

It is announced that the Canadian Council of Professional Engineers and Scientists has disbanded, following the withdrawal of financial support of the council by the Ontario Association of Professional Engineers, the Royal Architectural Institute of Canada, and two other bodies. The council was formed in 1945 to provide a means for the officers of engineering and scientific societies in Canada to meet for the discussion of mutual problems. In the earlier years of the council there were a number of projects which proved of general interest but recently there has been a slackening of interest with the result that a plebescite was held at the end of 1949 with regard to future action. Disbanding of the council resulted from the replies received. The Dominion Council of Professional Engineers continues to be the medium for linking the work of the various provincial professional engineering associations, some of which have working agreements with the Engineering Institute of Canada, which continues as a national voluntary engineering society.

The Florida State Council of Associated General Contractors has elected Ivy H. Smith of Ivy H. Smith Construction Co., Jacksonville, as president. He succeeds Joseph J. Ot, of Miami. Other officers: J. Hilbert Sapp, Palm Beach; C. T. Dawkins, Tampa; E. H. Hunter, Jacksonville; William Soule, Pensacola; and Frank J. Rooney, as vice-presidents. The executive secretary will be appointed later.

Richard Decker has been elected president of the St. Louis University chapter of the Missouri Society of Professional Engineers. Other officers are Andrew Klethermes, vice-president; Thomas Lanham, secretary; Michael Cherer, treasurer; and Paul Riehl and Matthew Mayer, delegates.

B. C. Budd, general manager of the Packard Motor Car Co. export division, New York, has been reelected.

(Continued on page 53)

Johnson & Johnson Baby Products Plant
Cranford, N. J.

Modern production methods ... fire protection

...oted for the streamlined beauty and functional perfection of its manufacturing facilities, the Johnson & Johnson Baby Products Plant at Cranford, N. J., carries modernity of construction one step farther through the provision of absolute fire safety by means of *Automatic Sprinklers*.

The provision of safety to life and property has for years been the primary aim of the J & J management, and *Automatic Sprinkler* protection has past proved its fire combatability. It stands ready at all times to give instant effective action at the first indication of flame. Because of this speedy detection, fires in sprinklered properties are usually extinguished in their infancy with but few sprinklers in actual operation, consequently little or no water damage is sustained.

Of further important consideration is the fact that approved *Automatic Sprinkler* installations allow for savings of upwards to 90% in insurance premiums and, like any other capital asset, can be amortized over a given period of years, with their initial cost ultimately taken as an operating expense.

Let one of our fire protection engineers show you how to *save lives ... save property ... and save money with Automatic Sprinklers.*

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

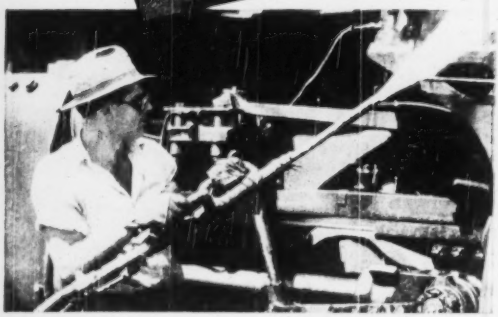
Automatic Sprinkler
FIRST IN FIRE PROTECTION

OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

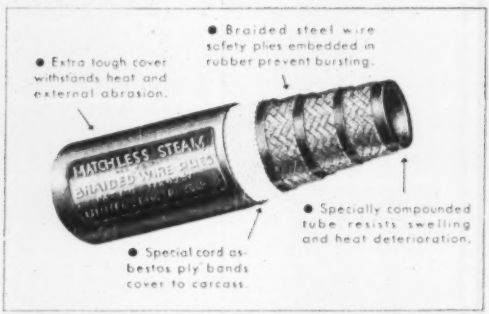
DON'T TAKE CHANCES ON TOUGH JOBS

USE U. S. RUBBER NON-BURST HOSE FOR TOP SAFETY WHEN WORKING WITH DANGEROUS MATERIALS

CLEANING BRICK OR STONE requires a hose that resists the cutting effect of the sand or steel shot passing through it. U. S. Rubber's Sand Blast Hose has a tube especially designed to withstand such abrasion, and its 4 plies of cotton duck give a strong, flexible body to prevent dangerous kinking or whipping.



FATAL SCALDING can easily happen when you're handling saturated steam at pressures up to 200 pounds. Safest records appear to be those of users of U. S. Matchless Steam Hose because it is non-burst. Recommended for gaskets, oil refineries, steam supply lines in railroad yards, and many other uses.


● Braided steel wire safety plies embedded in rubber prevent bursting.
● Extra tough cover withstands heat and external abrasion.
MATCHLESS STEAM
BRAIDED WIRE PLIES
● Specially compounded tube resists swelling and heat deterioration.
● Special cord asbestos ply bands cover to carcass.

INSIDE STORY. If, after long service, steam finally penetrates the inner lining of U. S. Matchless Hose, the steam merely seeps through the cover, which has become porous, indicating replacement should be made. Note the construction features above.

Whenever you have a problem which hose may solve, call on United States Rubber Company. As pioneers in the hose field, they know about techniques and new methods which often can greatly lower your operating costs. Let them analyze your particular working conditions. Write

A PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

chairman of the board, International Road Federation. He represents the Automobile Manufacturers Association. The federation, sponsored by petroleum, rubber, automotive and construction equipment interests, was formed in 1948 to stimulate the development of highways throughout the world. The federation acts as a clearing house for good roads information in some 55 foreign countries.

Ivan D. Wood, at Denver, Colo., irrigation engineer for the Soil Conservation Service, and M. R. Lewis of Washington, D. C., chief of the division of irrigation operations of the Bureau of Reclamation, are to be visiting professors at Colorado A & M College for summer session courses for advanced irrigation engineering.

Hugh H. Connolly has been appointed an instructor in civil engineering, University of Illinois, effective Sept. 1. He was graduated from the department of civil engineering at Illinois in 1948, and received his master's degree there in 1949.

L. L. Ray of Raleigh has been named director of the North Carolina State College Engineering Foundation and other foundations of the college, succeeding R. D. Brown, who resigned.

Roy K. Linsley, Jr. has been made associate professor of hydraulic engineering at Stanford University. Head of the hydrologic branch of the U. S. Weather Bureau for the last five years, Professor Linsley earlier had five years' experience on the Tennessee Valley Authority engineering staff and as a hydraulic engineer in Connecticut. At 33, he is the author of "Applied Hydrology", leading treatise on the study of rainfall and runoff. He is a replacement for Prof. Leon B. Reynolds, who retires this year.

Educational Notes

Hydraulic Lab. The hydraulics laboratory of the College of Engineering at the University of Washington in Seattle has been re-named the Charles William Harris Hydraulics Laboratory in honor of Prof. Charles W. Harris, veteran of the engineering faculty.

Engineers and architects. Architects may soon have a separate college at the University of Texas, rather than being part of the Engineering College, as they have been for 30 years. A faculty committee is studying the desirability of making architecture separate from the engineering college. However, architectural engineering probably will continue to be taught in the engineering branch.

THE NEW
JACKSON
ELECTRIC VIBRATOR

POWERFUL . . FAST . . RELIABLE

The Jackson Model FS-150A Flexible-Shaft vibrator with its 2½ HP Universal motor has more than ample power for uninterrupted placing of the stiffest mixes even when using the maximum length of shaft (28'). Provides 8,000 to 10,000 VPM and is built to withstand the most severe usage.

PLUG IT IN ANYWHERE

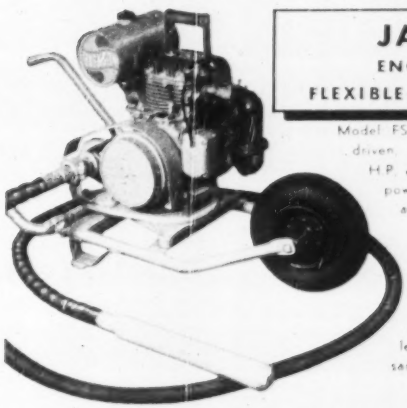
that 115 volt, 60 cycle single phase AC or Direct Current is available.

HANDY AS A POCKET IN A SHIRT

May be had with any length of shaft up to 28' and choice of 3 vibrator heads. And since it weighs but 50 lbs., it is ideal for thin or thick sections, for high places, reaching the otherwise difficult-to-get-to spots, incasing structural members and, in fact, every phase of general construction.

QUICKLY ADAPTABLE TO DRILLING

WET OR DRY GRINDING. The FS150A is truly an outstanding buy for the general contractor. See it at your Jackson Distributor or write for complete details.



JACKSON
ENGINE-DRIVEN
FLEXIBLE-SHAFT VIBRATOR

Model FS-6A is the finest of the engine-driven, flexible-shaft-type vibrators. 4.7 H.P. engine supplies more than enough power under all conditions. It's available with 3 heads for thick or thin sections. Shafting is furnished in 7' and 14' lengths up to 28'. Frequency (up to 7500 VPM) and amplitude are carefully balanced. Grinding and drilling attachments available. An excellent performer as proven on thousands of jobs. Write for details.

OTHER MONEY-MAKING VIBRATORS

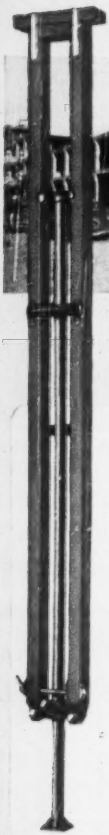
for every type of construction — thin sections, mass concrete placement, highway, airport and municipal paving. Soil compaction. Portable Power Plants.

FOR SALE OR RENT at your JACKSON DISTRIBUTOR

Get your free copy of the Jackson "POCKET GUIDE" describing the entire line.

ELECTRIC TAMPER AND EQUIPMENT CO., Ludington, Mich.

HUNDREDS OF MANHOURS SAVED HERE . . .

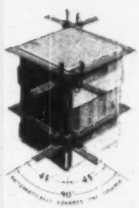


By Using ROOSHORS AND ROOS COLUMN CLAMPS

Count the number of shores necessary in forming the building above, then estimate the amount of material and the great number of manhours needed to do the same job with old fashioned 4 x 4 shores.

ROOSHORS . . . save two important items in construction—time and material. Rooshors fit on every job, yet, are readily handled by one man—transporting, setting, releasing and moving to a new location. Rooshors in sizes 8 ft. to 14 ft. and 7 ft. to 13 ft. have a six foot range of instant adjustment. Shorter heights are handled by the 5 ft. to 9 ft. size—highest stories are shored with Roos Extension Shores.

ROOS COLUMN CLAMPS . . . One contractor has said that his men can clamp twice as many columns with Roos Column Clamps as with different type clamps. Roos Clamps are foolproof—it is impossible to put them on wrong. They save every time you use them.



Rooshors and Roos Column Clamps are available for rental or purchase from warehouse stocks in principal cities.

Write today for Bulletin 351

BAKER-ROOS, INC.
602 WEST McCARTY STREET
INDIANAPOLIS 6, INDIANA

Stang WELLPOINT SYSTEM

For KNOW-HOW • ENGINEERING • SUPERVISION • EQUIPMENT to keep jobs DRY

The Stang System has proved its efficiency and economy on both large and small jobs all over the United States. Stang engineering and supervision in planning, installation and operation insures a DRY JOB at all times.

JOHN W. STANG CORPORATION

2 Broadway, New York 4, N. Y. | 2123 S. 56th St., Omaha, Nebr. | 8221 Atlantic Ave., P.O. Box 631, Bell, Cal.

San Francisco Post, Society of American Military Engineers recently elected as president Rear Admiral E. N. Mueller, CEC, USN, director of the Pacific & Alaskan Divisions, Bureau of Yards and Docks. He succeeds Col. Cabell Gwathmey. Other officers are: 1st vice president, Clyde E. Bentley, San Francisco consulting engineer; 2d vice president, Richard O. Eaton, civil engineer, South Pacific Division, Corps of Engineers, Oakland Army Base; secretary, Lt. Comdr. O. E. Forbess, CEC, USN, office of the Director, Pacific & Alaskan Divisions, Bureau of Yards and Docks, Treasure Island; treasurer, Paul F. Kean; and directors, Prof. Harmer E. Davis, Lt. Col. James D. Strang, CE, Lt. Col. Henry M. Salley, CE, Brig. Gen. Dwight F. Johns, Lt. Col. John H. Skeggs, and Colonel Gwathmey.

Frank G. White, San Francisco engineer, was recently appointed by Gov. Earl Warren to serve on the State Board of Registration for Civil and Professional Engineers. Mr. White, formerly chief engineer for the State Board of Harbor Commissioners, succeeds Augustus E. Siph. Sam Francisco, resigned.

Dayton, Ohio, Builders Exchange has re-elected Richard P. Clemens as president, Myron V. Ecklandt, treasurer, and Ernest E. Jones, executive secretary. F. S. Chamberlin was elected vice president, succeeding Paul Beuttner. New directors, Quentin Bremer, residential builders group; Leo Fetting, general contractors group; Al Eichorn and Paul Smiley, subcontractors group; Elmer Lupinskie and Russell Albaugh, material and equipment dealers group.

MAJOR MEETINGS

Building Officials Conference of America, Indianapolis, Ind., June 4-8.

National Society of Professional Engineers, annual meeting, Hotel Statler, Boston, Mass., June 8-10.

Central States Sewage Works Association, Hotel Lincoln, Indianapolis, Ind., June 9-10.

Western Association of State Highway Officials, Mapes Hotel, Reno, Nev., June 12-15.

Pennsylvania Sewage Works School, State College, Pa., June 19-23.

Pennsylvania Water Works School, State College, Pa., June 26-30.

Ohio Sewage & Industrial Wastes Treatment Conference, Hotel Colonial, Cincinnati, Ohio, June 28-30.

American Society of Civil Engineers, annual convention, Royal York Hotel, Toronto, Ont., July 12-14.

UNIT PRICES BID BY CONTRACTORS

Highway widening at N. Woodstock, N. H.

Four contractors, only 0.5% apart, submitted bids to the New Hampshire Highway Department, March 2, for the $205,208 improvement of 1.051 miles of 24-ft wide pavement on U. S. Route 3 in North Woodstock, N. H. Robert H. Whitaker is construction engineer, and Orville H. Linden is resident engineer.

The job consists of widening the street, grading, drainage and hot-mix plant concrete pavement, asphalt sidewalk and granite curbing.

Wage rates prevailing on the job are unskilled labor, $1.15 per hour; truck drivers, $1.20-1.25; bulldozer and grader operators, $1.70; carpenters, $1.75; stone masons, $2.25.

Concrete in the unit prices required for Class A (minimum 1-month) compressive strength of 2000 lb per sq inch and for Class D, 1500 lb per sq inch.

Ledge excavation includes all solid rock and boulders of 1½ cu yd or more. Earth excavation covers all other not classified as ledge. The same definition applies to trench excavation. Items designated "work in town streets" cover underground piping and utility structures may be encountered.

1 William E. Drake, No. Bennington, Vt. (contractor) $177,291
2 W. H. Hinman, Inc., No. Anson, Me. 186,452
3 Lunders & Grube, Inc., Portsmouth, N. H. 187,033
4 Dorrick Dubroof, Jericho, Vt. 196,527

Items	Quantity	Unit	Unit Prices 1	2	3	4
Clear & grub	A	L.S.	$500.00	$500.00	$500.00	$500.00
Remove trees	ea	50	30.00	30.00	30.00	30.00
Excavation						
Earth, all per hour	cy	22,500	.85	.75	.78	.80
Ledge	cy	3,000	2.00	2.00	2.00	2.00
Earth, trench	cy	2,500	1.00	2.00	1.00	2.00
Earth, trench D	cy	2,500	1.50	2.25	1.50	2.00
Ledge, trench D	cy	600	2.00	3.00	2.00	3.00
Grass overhaul	sta	3,000	.10	.10	.10	.10
Fine grading	sy	25,000	.10	.10	.10	.10
Gravel	cy	11,500	.20	1.10	.20	1.00
Grass surface	sy	1,500	1.20	1.00	1.20	1.00
CI A wash surf treat	gal	10,000	.20	.25	.20	.25
Type D bit mgh	T	75,000	9.00	8.20	9.00	8.20
Cover CI A	cy	21	60.00	90.00	60.00	90.00
Cover CI D	cy	21	60.00	50.00	60.00	50.00
Bond steel	lb	1,500	.12	.12	.12	.12
Mastic cold mastic	cy	162	30.00	25.00	30.00	25.00
12" SSBU pipe	lf	1,000	2.50	2.50	2.50	2.50
15" SSBU pipe	lf	1,000	2.90	2.75	2.90	2.75
18" SSBU pipe	lf	1,000	3.40	3.00	3.40	3.00
8" B C M pipe	lf	200	1.50	2.00	1.50	2.00
Rip rap A	cy	12	25.00	20.00	25.00	20.00
B C M pipe include						
6"	lf	950	1.00	1.00	1.00	1.00
12"	lf	150	2.00	1.50	2.00	1.50
15"	lf	150	2.40	2.00	2.40	2.00
Lead 12" wtr pipe	lf	1,500	1.50	1.50	1.50	1.50
Wrought couth A	lf	1,500	1.50	1.10	1.50	1.10
Conc. granite curb A	lf	350	1.50	1.50	1.50	1.50
Gravel Bed						
Cobble std GR IA	lf	500	1.25	1.00	1.25	1.00
Multi-cell std GR 2BB	lf	1,000	1.50	1.50	1.50	1.50
Wel. angle std GR 3A	lf	100	2.25	2.00	2.25	2.00
Iron pipe sngl	lf	150	1.50	1.50	1.50	1.50
Iron pipe dbl	lf	200	1.75	1.75	1.75	1.75
Anchorages	ea	3	50.00	50.00	50.00	50.00
Foot wires	ea	15	10.00	10.00	10.00	10.00
Catch basin type G	ea	13	175.00	150.00	150.00	150.00
Catch basin type H	ea	2	150.00	100.00	150.00	100.00
Rebuilt manholes	lf	7	25.00	10.00	25.00	10.00
Adjust old covers	ea	10	50.00	12.00	50.00	12.00
Conc. curb inlets A	ea	22	50.00	50.00	50.00	50.00
Metal drop inlets	ea	2	50.00	50.00	50.00	50.00
Curb board	lf	1,500	.15	.15	.15	.15
2" asph. sidewalk	sy	2,000	2.00	2.00	2.00	2.00
Permit markers	ea	1	20.00	25.00	20.00	25.00
Maint traffic	lf	5,000	.15	.10	.15	.10
Beam 4' deep	ea	200	30.00	30.00	30.00	30.00

Gila Valley Canal, Ariz. Desilting basin rebuilt

All eight bids submitted April 11 to the Bureau of Reclamation, Yuma, Ariz., were below the engineer's estimate of $269,352 for reconstructing the Gila Valley Canal desilting basin, Imperial Dam near Yuma. The low bid, $178,729, is 33% and the high bid is 5% below.

The job includes excavation for begin-drunch construction of check structure, cleaning mud and silt out of the desilting basin, foundation, dams and concrete lining for basin.

Work to be completed in 150 days. Labor and materials are furnished by contractor except sand, rock, aggregates and cement.

Minimum wages are unskilled labor, $1.45 per hour; power equipment operators, $1.75-2.40; carpenters, $2.10; master mixers, $1.824; dump truck drivers, $1.524-1.874.

1 Contract Mgmt. Corp., For amount Calif. $178,728.50
2 Atlantic Sand & Rock Co., Phoenix, Ariz. 189,750.00
3 Ralph A. Bell Mason Co., Calif. 192,142.00
Engineer's estimate 269,352.00

Items	Quantity	Unit	Unit Prices 1	2	3
Excavation					
Common, Inspect	cy	10,500	.60	1.10	.60
Rock, Inspect	cy	2,500	.60	1.10	.60
Common, struct	cy	2,500	.60	3.00	.60
Rock, struct	cy	500	1.50	5.00	1.50
Compact emb and	cy	2,500	.50	.50	.50
Backfill	cy	1,000	.50	.50	.50
Compact backfill	cy	500	1.25	1.00	1.25
Riprap	cy	100	2.50	5.00	2.50
Rough A stone rub					
Dress surfaces	ls			50.00	250.00
Rough A stone pile					
gray surf	ls		50.00	150.00	50.00
Rough A stone hill	ls		150.00	200.00	150.00
Remove conc. struct and					
wall A gray slab	cy	15	5.00	15.00	5.00
Plain fill in slab	cy		250.00	300.00	250.00
Pile grease slab	ls		50.00	200.00	50.00
Repair slab, misc. struc	ls		50.00	150.00	50.00
Concrete lining, clean out					
mud, silt	cy		250.00	2,000	250.00
Remove conc. lining	cy	1,500	2.50	1.00	2.50
Prep. foundation, lining	cy	11,000	.06	.14	.06
Compact foundation	cy	11,000	.02	.01	.02
Prep. & compact foundation					
for side slope	cy	2,000	.24	.18	.24
Concrete sand blket	cy	11,200	.04	.06	.04
Concrete gravel blket	cy	11,200	.04	.04	.04
Compact sand blket	cy	11,200	.04	.04	.04
Compact gravel blket	cy	11,200	.04	.04	.04
Drains					
12" sand blket	cy	150	2.00	1.50	2.00
18" gravel blket	cy	900	2.00	1.00	2.00
6" structural steel bkt	lf	1,400	2.00	1.00	2.00
2" Exp.	lf	1,250	2.50	2.00	2.50
Concrete in					
Check structure	cy	35	10.00	10.00	10.00
Pilot paving	cy	30	25.00	20.00	25.00
Headl basin	cy	1,400	10.00	10.00	10.00
Drum outlet	cy	1,400	10.00	10.00	10.00
Form A bulk cut	bd	500	6.00	5.00	6.00
Form A pl mat for	lf	11,000	.06	.05	.06
2" galv fillmatl cut Expan	lf	200	1.50	1.00	1.50
H.C. tube water stop	lf	20	1.50	1.00	1.50
H.C. tube water stop	lf	450	1.50	1.00	1.50
Bulkhead A grt					
sheeting pl	lf	1,250	1.20	1.10	1.20
sheeting pl	lf	1,150	2.00	1.50	2.00
Plug conc. to be	cy	1,500	.60	.50	.60
Form A erect timber					
Headgate slop Lg Man			200.00	100.00	200.00
Fab misc metal ass	lb	1,500	.50	.60	.50

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ELSIE EAVES, Manager — J. A. MAHONEY, Reports — M. R. ROESSLER, Statistics

WATER SUPPLY

BIDS ASKED

N. C. Morganton—B.A. 5-31—Town (P. O. Collett, Supt. Water Dept.) plans water supply, purification and distribution system; 1 mgd capacity; 1 elevated steel tank, 1 ground-level reinforced concrete reservoir, 1 pumping station, 1 filter house and appurtenances for water purification plant; 1 elevated steel tank, 1 ground-level reinforced concrete reservoir, 1 pumping station for distribution system. Plans deposit $15. Asheville-Hendersonville Engr. Co., 1228 Biltmore Ave., Asheville, engr.

Calif., Fresno—B.A. 6-1—State Div. Architecture, Pub. Bldg., Sacramento, water supply system, pipelines, etc., at Fresno State College. Arch.-Engr. Bldg., Sacramento, state archt.

Conn., Hartford—B.A. 5-15—Metropolitan Dist. Water Bureau, Bd. Public Works, Hartford, plans 17½ mi. 52,000 ft. dia. to 12 in. cement-lined cast-iron pipe, 1,277 gate valves, 200 sluice gate valves.

Wis., Oshkosh—B.A. 6-1—City, water supply system: 4 sand filters, 4 carbon filters, 4 lift pump units, water pump drainage pump. Plans deposit $40. Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, engrs.

Miss., Ripley—B.A. 4-17—City, City Hall, water well, 400 ft. deep, water plant, etc. Plans deposit $10. Leland B. Cook, P. O. Box 2410, Tupelo, engr.

† N. M., Gallup—B.A. 4-24—U. S. Indian Service, Albuquerque, Wingate Indian Hospital, deep well, water well, 2 vertical turbine deep well pumps, 1,000 gpm each, 1 electric motor driven, 1 diesel engine driven, 12,000 gal. storage tank on 100-ft. tower, 12,000 gal. storage tank on 50-ft. tower, 1 chlorinator, 1 fluoridator, 1 water softener, 1 water softener by-pass, 1 water softener brine tank, 1 water softener brine measuring tank, 1 water softener brine pump, 1 water softener brine measuring pump, 1 water softener brine measuring pump, 1 water softener brine measuring

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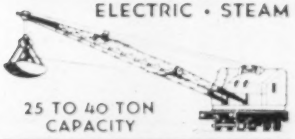

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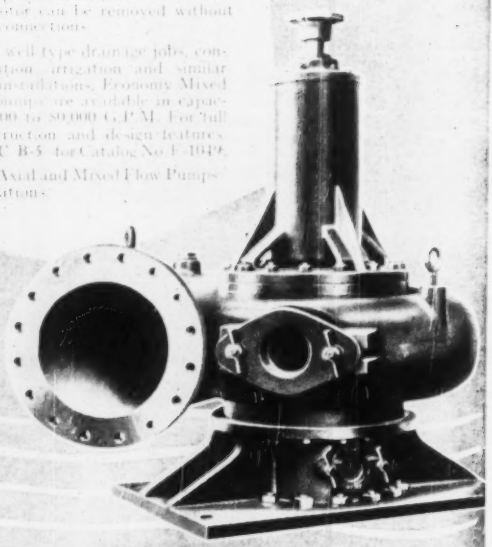

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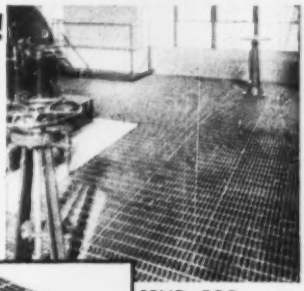

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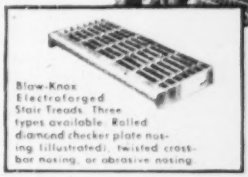

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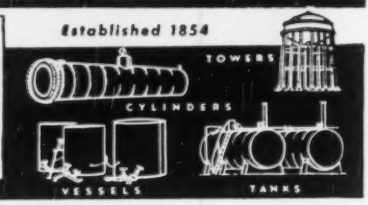

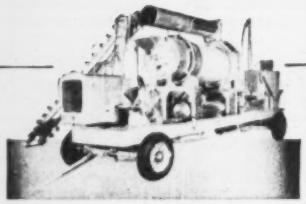

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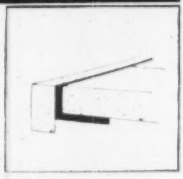

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reinforced steel; 25 classroom Frank Elementary School, $800,000 (2); 2 story, reinforced steel, 14 classroom Jefferson Elementary School, $611,000. Plans deposit $25. Kump Associates, 262 California St., San Francisco, architects. CD 7-25.

† Alaska, Fort Richardson—BARRACKS—BA, 4-15—C, 15 barracks (ARC 942); 610 PM, Seattle. Washington district, Corps of Engineers, Seattle, Wash. AI invitation; two $50,000 deposits. Sch 5-16-50; 2 sets free. Plans deposit $25 each.

Va., Charlottesville—MEDICAL SCHOOL—BA, 4-20—At office Colquitt, W. Dumas, Jr., pres. University of Virginia, Charlottesville; general contract, plumbing, heating and ventilating, electrical work; plumbing, heating and ventilating; electrical work; laboratory, kitchen, elevator, steel and wiring; 4-story Medical School building, Plans deposit $35. Keyser & Hollis, Inc., New York, N. Y., architects.

† New Hampshire, CLOTHING—BA, Aug. 4, 22—(1) S. Army Base, Boston, $5; Massachusetts Army and Navy Munitions Plant, Andover, $5; (2) Army Base, Boston, $5; Massachusetts Army and Navy Munitions Plant, Andover, $5; (3) Army Base, Boston, $5; Massachusetts Army and Navy Munitions Plant, Andover, $5; (4) Army Base, Boston, $5; Massachusetts Army and Navy Munitions Plant, Andover, $5;

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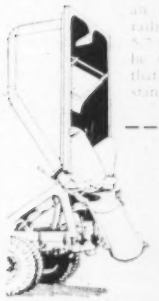

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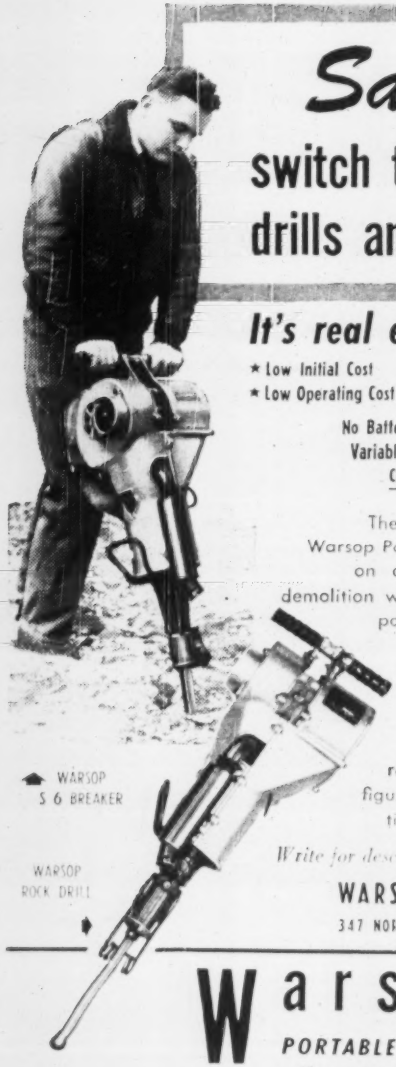

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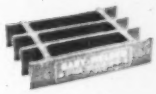

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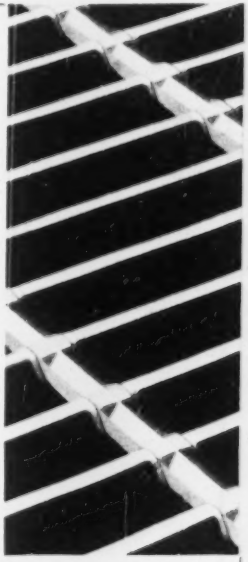

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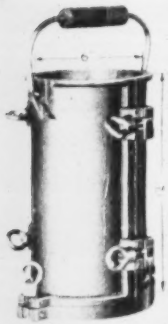

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Calif., Riverside, [illegible], Riverside Co., Wyatt, Neutra & Dion, 141 W. Victoria St., Santa Barbara, Architects, $350,000

▲ Calif., Whittier, SCHOOL, [illegible], Whittier, $2,500,000

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Conn., West Hartford, [illegible], Town of West Hartford, Dr. E. H. Thorne, Supt. of Schools, brick, steel, Farmington Ave. & Mountain Rd., $450,000, brick, steel construction, Sedgwick Rd. Sect., $400,000

▲ Idaho, Moscow, [illegible], $500,000

▲ Ia., Ames, [illegible], Story Co., Board of Education, Ames, Architect, $1,150,000

Md., Baltimore, LIBRARY, State Dept. Pub. Improvements, Park Ave. and Preston St., Wilson, Harrison & Morris, Architects, $400,000

▲ Md., Jessups, [illegible], State Dept. Pub. Improvements, Park Ave. and Preston St., Wilson, Harrison & Morris, Architects, $1,250,000

▲ Md., Valley Mills, [illegible], State Dept. Pub. Improvements, Park Ave. and Preston St., Wilson, Harrison & Morris, Architects, $1,500,000

Mich., Lake Linden, [illegible], $750,000

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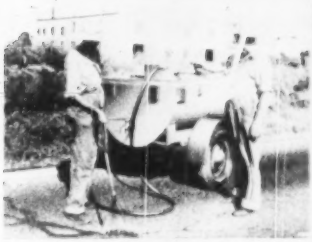

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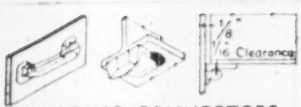

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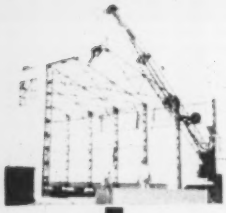

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▲ Tex., Pharr—HOUSING—Pharr Housing Auth., L. V. Richardson, Exec. Dir., Pharr, 200 low-rent housing units, $1,000,000.

▲ Tex., Texarkana—HOUSING—Texarkana Housing Auth., Lloyd Kuhn, chmn., Texarkana; plans by J. N. McCammon, 1st N. Bank St. Bldg., Shreveport, & Cox, Tex., 150 low-rent housing units, $560,000; sept. 2 bids due Sept. 15. $560,000.

▲ Wis., Milwaukee—SCHOOL—Bd. School Directors, 1111 N. 19th St., plans by E. Wilke, C/W owner and Graham & Johnson, 734 N. Jefferson St., 2000-pupil Fairmount Ave. school, $1,250,000.

▲ Puerto Rico, Rio Piedras—HOSPITAL—Puerto Rico Planning Board, for construction, enlargement and equipment hospital, $6,300,000.

COMMERCIAL BUILDINGS

▲ Ala., Mobile—APARTMENT UNITS—Highland Terrace Apartments Inc., c/o Lt. Col. Ring, 55 Water Bldg., Birmingham, 210 apartment units, $1,500,000; CD 4-28.

▲ Calif., Oakland—HOTEL—Moody Hotels, Inc., J. Jones, Manager, 1111 Financial Center Bldg., $1,000,000.

Calif., Santa Monica—HOSPITAL etc.—Lutheran Welfare Society, 1216 St. St. plans by Walker & Kaufmann, Monica Hospital addition, $900,000.

D. C., Wash.—CHURCH—Stewards Presbyterian Church, 22nd and Jackson Sts., N.E., plans by Arthur A. Weidner & Bro., Inc., 1420 Chapin St., N.W., 2-story church, Eastern Ave. and Jackson St., N.E., $600,000.

▲ Idaho, Blackfoot—HOSPITAL—Area County Co., $2,000,000.

▲ Idaho, Idaho Falls—HOSPITAL—Bd. of County Co., $2,000,000.

▲ Ill., Berwyn—HOSPITAL—Addition Community Memorial Hospital, W. Cermak Rd. and 52nd St., hospital addn., $1,200,000.

Ill., Chicago—APARTMENT—A. M. Kisenky & Morris Rosenberg & Lowenberg, architects, 111 W. Monroe St., Zone 3, 6-story apartment building, $517,929.

Ill., Chicago—APARTMENT—Lee Levin & Associates, 111 W. Monroe St., Zone 3, 6-story apartment building, $891,395.

▲ Ill., Chicago—APARTMENT—North Park Corp., 105 W. Monroe St., Zone 3, 6-story apartment building, $1,153,167.

▲ Ill., Chicago—APARTMENT—Alfred B. Perlman, 105 W. Monroe St., Zone 3, 6-story apartment building, $2,186,693.

▲ Ill., Chicago—APARTMENT—Frank A. Lenkauskas, 111 W. Monroe St., Zone 3, 6-story apartment building, $1,913,046.

Ill., Chicago—APARTMENT—Henry A. & Daniel Zinn, 1440 W. Irving Park Rd., Zone 13, 6-story apartment building, $451,000.

Ill., Waukegan—APARTMENT—Frank L. Kruse & Associates, 1 N. La Salle St., Chicago, 6-story apartment building, $426,000.

▲ Kan., Hutchinson—HOTEL—Hotel Hutchinson, Inc., 1400 Main, hotel; by Mitchell & Hyatt, 329 W. 23

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▲ Ore., Vaughn—MILL—Long-Bell Lumber Co., Long-[illegible] contracting mill, $2,500,000.

Tex., Dallas—FREIGHT TERMINAL—Merchants Fast Motor Lines, Inc., 1400 S. Lamar St., 2-story 54-ft. by 400-ft. steel frame terminal, concrete floors, 550-ft. truck and dragon sts. in Trinity Industrial Center, $300,000.

Tex., Lubbock—GARAGE, SERVICE STATION—J. D. Chandler et al, c/o Chandler & Wood, pres., Lubbock, 150' by 200' 2-story steel frame and masonry garage, $300,000.

Tex., Orla—GASOLINE PLANT—Permian Petroleum Co., [illegible] gasoline plant, absorption unit, [illegible] 26,000 gal. gasoline and liquid gas tanks, $400,000.

Tex., San Antonio—PARKING GARAGE—St. Marys University, c/o Edmund L. Lee, architect, 312 Dwyer Ave., 5-story, Precast & Tilt Wall & Concrete Erection Co., Mail Bldg., 5-story, 92,000 sq. ft. concrete, reinforced, [illegible] parking garage for [illegible] Between St. Marys and Navarro Sts., $450,000.

UNCLASSIFIED

Iowa—RURAL DISTRIBUTION LINES—Linn Co. Rural Electrification Administration, Mount Vernon, [illegible] Linn Co., $210,000. A. W. Ayres, Vinton, engr.

Kansas—RURAL DISTRIBUTION LINES—Cooperative [illegible] 241 mi. [illegible] $333,000.

Md., Baltimore—ATHLETIC FIELD—City Bureau of Parks, Courts, 41 Municipal Bldg., plans to develop [illegible] Wilson & Roberts, engrs., Municipal Bldg., [illegible] Field, [illegible] Ave., [illegible] Ave., $650,000. R. E. L. Williams, 200 Municipal Bldg., Zone 2, Bldg. [illegible] engr.

Neb., Hastings—SWIMMING POOL AND [illegible]—City plans to [illegible] H. M. Mackie, 414 W. Jackson, Chicago, Ill., swimming pool and [illegible], $125,000. CD 10 [illegible]

N. J., Atlantic City—PARK—City, park over the ocean on Garden Pier, $800,000.

▲ North Carolina—RURAL DISTRIBUTION LINES—Roanoke Electric Membership Corp., Rich Square, 500 mi. rural distribution lines, headquarters facilities and [illegible] improvements, $1,070,000.

North Carolina—RURAL DISTRIBUTION LINES—Tri-County Electric Membership Corp., Goldsboro, 231 mi. rural distribution lines, Wayne Co., $610,000. CD 7-[illegible]

▲ O., Columbus—CULTURAL—Board of Trustees Franklin County Veterans Memorial, Bldg. Commission, [illegible] by Allied Architects Assn., 33 N. Michigan St., Toledo, 3-st. stone, steel frame, brick, [illegible] Memorial Coliseum, W. Broad St., $4,500,000. CD 3-21-44, under Public Bldgs.

Texas—NATURAL GAS LINES—Oil Pipe Line Co., Houston, [illegible] Co., Houston, Texas, [illegible] natural gas [illegible] Sharon Ridge Gasoline Plant and to [illegible] gas underdeveloped Snyder area, Scurry Co., $750,000.

▲ Texas—RURAL DISTRIBUTION LINES—Nueces Electric Cooperative, Inc., Robstown, [illegible] rural distribution, 240 mi. rural distribution lines, [illegible] Nueces Co., $3,000,000. CD 3-[illegible]

Texas—RURAL DISTRIBUTION LINES—North Plains Electric Cooperative, Perryton, 226 mi. rural distribution [illegible] $620,000. CD 3-27-[illegible]

▲ Tex., Lubbock—COLLEGE—Texas Technological College, [illegible] Business Administration Building, Lubbock, $1,000,000-$1,500,000.

Tex., Navasota—TELEPHONE LINES—Navasota Telephone Co., Navasota, [illegible] telephone lines, $200,000.

▲ B. C., Vancouver—BUILDING—Parks, Natural [illegible] Bldg., [illegible] $1,000,000.

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Scranton, Pa. Dept. E, U. S. A.

CONSTRUCTION REPORTS–Second Section

WATER SUPPLY

BIDS ASKED

† Wash. Bremerton

Ont. Hamilton

SEWERS, WASTE DISPOSAL

LOW BIDDERS

Calif. Long Beach

CONTRACTS AWARDED

▲ N. Y. Port Jervis

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

May 30
North Carolina
June 2
Kansas
Minnesota
June 6
Indiana

Maryland
Oklahoma
June 7
California
June 8
New Jersey

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

May 31
North Carolina
May 31
Delaware
Massachusetts
Rhode Island
June
Texas
June 1
Kansas

June 6
Maryland
Oklahoma
June 7
California
June 8
New Jersey
June 9
Pennsylvania

Ont. St. Catharines

† Wyoming

Sublette Co.

† Washington

† Washington

† Oregon

LOW BIDDERS

▲ Pennsylvania

$788,644

CONTRACTS AWARDED

Maryland

▲ New York

▲ New York

▲ Pennsylvania

EARTHWORK, WATERWAYS

BIDS ASKED

▲† Texas

N. S. St. Marys

Ont. Leamington

Ont. Nipissing

† Arizona California Nevada

† Arizona

† Colorado

† Colorado

† Ky. Louisville

† Kentucky

† Louisiana

† Maryland

† New Mexico

New York

† South Dakota

† Virginia

† New York

† Florida

† Utah

† Wisconsin

† Montana

† California

† California

† Idaho

† Wisconsin

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3. ***Adjustable Capacity.*** With one simple "at the surface" adjustment, capacity can be varied over a wide range without power wasting "throttling." Adjustment nut can also be used to compensate for wear.

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Meters • Generators • Stokers • Railroad Motor Cars
and Standpipes • Farm Equipment • Magnetos

† Montana—B-A—S. Eng., Fort Peck, Lower Yellowstone project, Fort Peck Dam, Fort Peck. CIVENG 24-[illegible]-50-51. ED 4-27.

† New Mexico—B-A—U.S. Bureau Reclamation, Dist. Engr., Post Office Bldg., Amarillo, Tex., purchase prematurely operated pumping plants and appurtenances, High Line Canal, Stages 1 thru 5, Fort Sumner Proj., Spec. DC-6511. Bids 10:00 MST 5/18. CD 9-7-49.

† Oregon—B-A—U.S. Eng., Pittock Block, Portland, repair north jetty and construct pile trestle, extend existing trestle and mop at north jetty, mouth of Columbia River. CIVENG 24-[illegible]-50-51. ED 4-27.

† Tennessee—B-A—U.S. Eng., P.O. Box 41, Memphis, Zone 1, construct 2 locks and dams in vicinity of Eastport, Miss., and Gilbertsville, Ky., on Tenn. R., and appurtenant works, including power plants, on Cumberland R. between Nashville and Smithland, Ky., and on Kentucky R. between Gilbertsville and mouth of river, and on Barkley Canal. CIVENG 40-041-50-51. ED 4-27.

† Oregon—B-A—U.S. Eng., Pittock Block, Portland, repair bottom and outer structure at Sorenes Dam. CIVENG 24-[illegible]-50-51. ED 4-27.

† California—B-A—Bureau Reclamation, Dist. Engr., Interior Building, Sacramento, construct pilot cuts of Klamath Dam, Central Valley Proj., consisting of excavation of Pit 3, Spec. No. DC-6512. Bids 10:00 MST 5/18. Denver Federal Center, Denver, Colo. CD 5-18-50.

† Montana—B-A—U.S. Bureau Reclamation, Dist. Engr., Interior Bldg., Denver Federal Center, Denver, Colo., furnishing and delivering 2 vertical-shaft, diagonal-flow pumps, each rated at 250 cfs at 22 ft head, for Milk River Proj., Fort Peck Unit, Spec. No. DC-6513. Bids 10:00 MST 5/18. CD 5-18-50.

† Montana—B-A—U.S. Bureau Reclamation, Dist. Engr., Interior Bldg., Denver Federal Center, Denver, Colo., furnishing and delivering 2 vertical-shaft, diagonal-flow pumps, each rated at 250 cfs at 22 ft head, for Milk River Proj., Fort Peck Unit, Spec. No. DC-6513. Bids 10:00 MST 5/18. CD 5-18-50.

LOW BIDDERS

▲† Washington—B-A—U.S. Eng., [illegible], Walla Walla, Wash., [illegible] at Mayfield Dam, Cowlitz R., Wash., [illegible] Spec. DC-6511, Bids 5/2 [illegible] Schedule 1, [illegible] $2,167,813 . . . Schedule 2, [illegible] $2,215,[illegible]

CONTRACTS AWARDED

† Arkansas—[illegible] $814,750

† California—[illegible] $865

▲Ky., Louisville—[illegible] $1,345,579

▲†—[illegible] $2,195,570

† New York—[illegible] $732,481

AIRPORTS

BIDS ASKED

Alta., Namao—RCAF, etc.—B-A—[illegible] RCAF station, [illegible] $2,[illegible]

† Mo., St. Joseph—[illegible]

† Va., Langley Field—[illegible] $[illegible]

Wis., Milwaukee—Airport, Mitchell Field, Milwaukee Co., [illegible] $849,293

PUBLIC BUILDINGS

BIDS ASKED

Newfoundland, St. John's—LIVING UNITS—B-A—S. 33—Central Mortgage & Housing Corp., Bldg. 2, Naval Dockyards, St. John's, 140 living units, for Govt. of Canada. Plans deposit $50. P. J. Mangan, 1032 Gottingen St., Halifax, N.S., engr. CD 2-11-49.

Tenn., Athens—HEALTH CENTER—B-A—S. 31—At office of R. Brannon, engr., McMinn Co., McMinn County Courthouse, 2 story health center bldg., site improv., electric wiring, heating and plumbing. Telmon T. Fridmon, 521 Pioneer St., Chattanooga, archt.

▲ Colo., Greeley—HOSPITAL—B-A—6/1—Weld County Hospital Assoc., Greeley, Cottonwood St., 3 story, basement, and 2 story wing, 1 story connecting wing, 100 beds, [illegible] Approx. $1,000,000. Saunders & Tyler, Denver, archts. CD 1-24-49.

▲ Fla., St. Petersburg—HOSPITAL—B-A—6/1—City of Mount Park Hospital, $2,500,000. Extended date. DeWitt & Swaine, 2325 Cedar Springs St., Dallas, Tex., archts. CD 2-3-49.

† N. Y., Rochester—PLANT—B-A—6/1—Pure Oil Co., [illegible] Bldg., New York, Zone 17, [illegible] Industrial Power Co., [illegible] Approx. $13[illegible]

N. C., Winston-Salem—[illegible]—B-A—6/1—[illegible] Lewellyn Assoc., Inc., 2 story [illegible] addition to post [illegible] Marshall & Stowe, Wachovia Bank Bldg., archts.

† N. D., Devils Lake—[illegible]—B-A—6/1—U.S. Public Health Service, Bureau Medical Services, Procurement & Supply Division, Washington, D.C., [illegible] Spec. 49-[illegible] Bids 10:00 CST 6/1. CD 4-[illegible]

Tex., Houston—[illegible]—B-A—6/1—[illegible] Forrest Jackson and Homer Hutchinson, Houston, archts. Wilbert Mahon & Crane, 1430 Grandview St., archts. CD 4-24-49.

O., Avon Lake—[illegible]—B-A—6/1—Bid Basis, $2770 Lake Shore Power Co., at Lake Erie shore, [illegible] $[illegible] Plans deposit $10, refunded on return. Ralph S. Knowlton, engr., 1836 Euclid Ave., Cleveland. CD 4-[illegible]

O., Cleveland Heights—SCHOOL—B-A—6/1—[illegible] Hill, $300,000. Plans deposit $25, refunded. Walker & Weeks, archts. CD 4-21-49.

Pa., Philadelphia—[illegible]—B-A—6/1—[illegible] Auditorium and Municipal Arts, Harrisburg, general contract, [illegible] Plans deposit $15, refunded. W. H. [illegible]

Pa., Selinsgrove—[illegible]—B-A—6/1—[illegible] Susquehanna Township, [illegible] Plans deposit $[illegible]

Pa., Shippensburg—[illegible]—B-A—6/1—[illegible] Plans deposit $[illegible]

S. C., Greenville—[illegible]—B-A—6/1—[illegible] Plans deposit $[illegible]

Tex., Stephenville—[illegible]—B-A—6/1—[illegible] Plans deposit $[illegible]

† Washington—MAGNESIUM PLANT—B-A—6/1—State Dept. of Conservation and Development, Olympia, Wash., [illegible] Plans deposit $[illegible]

W. Va., Hamlin—[illegible]—B-A—6/1—State Dept. of Public Institutions, Charleston, [illegible] Plans deposit $[illegible]

Wis., Madison—HOSPITAL—B-A—6/1—[illegible] Plans deposit $[illegible]

†N. M., Las Cruces—AMMUNITION—B-A—[illegible] Army Ord. Dept., Box 1658, Albuquerque, [illegible] Plans deposit $[illegible]

▲ Ala., Tuscaloosa—HOSPITAL—B-A—6/2—Druid City Hospital Corp., [illegible] Jackson, Birmingham, [illegible] Approx. $1,000,000. [illegible]

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City Zone State

Houses, Bay & St. Louis Rd., Independence and 19 Ave., Owner builds. $1,822,800. CD 1-6.

▲ N. Y., Forest Hills—APARTMENT, 25-02 Austin Street Realty Corp., c/o Samuel Paul, archt., 165-18 Jamaica Ave., Jamaica, 6 story apartment, Austin St. and 75 Rd., Owner builds. $1,000,000. CD 1-6.

▲ N. Y., Jackson Heights—APARTMENT, Weeberley Gardens, Inc., c/o Irving & Fredericks, archts., 153 Pierrepont St., Brooklyn, Zone 2, 6 story apartment, 70-55 north of 37 Ave., Owner builds. $1,575,000. CD 1-31.

▲ N. Y., New York—APARTMENT, Wilson Gardens, Inc., 121 E. 149 St., Zone 55, four 3 story apartments, Watson and Webster Aves., Watson and Cauldwell Aves., Avalon Ave. between Wheeler and Castle Ave., Owner builds. $1,400,000. CD 1-7.

▲ O., Parma (br. Cleveland)—Cleveland Land Development Co., 5644 Turney Rd., Garfield Heights, three hundred and fifty 1 story frame homes, Pearl Rd. and W. 130 St., Parma Heights, separate contracts. $4,500,000.

▲ O., Parma (br. Cleveland)—HOMES—Eastern Brae Homes, Inc., 4837 Pearl Rd., Cleveland, Woodview Rd., Parma Heights, separate contracts. $1,060,000.

▲ O., Toledo—APARTMENT—Kenwood Gardens, Inc., 740 Leader Bldg., Cleveland, 72 apartments, 1604 suites, storm sewers, paving, to Kenwood Constr. Co., 10100 Vermont Ave., Wash., D. C. Approx. $4,500,000. Bids 4-25, awarded 5-15? CD 4-5.

▲ O., Toledo—APARTMENT, A. J. Zoller & Sons, Inc., 3302 Detroit Av., 26 2-family apartments (156 units), on Kenwood Blvd. between Lathrop Blvd. and Toledo Terminal R.R. Owner builds. $1,500,000.

▲ Pa., Pittsburgh—APARTMENTS—Cloverleaf Apartments, Inc., Box 432, Lethbridge, four 2 story buildings, 96x134 ft., apartments, one 6 story, former, 70x185 ft., apartment, Route 51, Baldwin Twp., to D/F Constr. Co., Box 372, Lethbridge. $1,000,000. Tennyson & Van Wart, 616 Washington Pl., Zone 16, archts.

▲ Tenn., Nashville—APARTMENT, College Hill Apartments, J. McKissick & McKissick, archts., Morris Bldg., apartment development, Owner builds. $1,000,000.

▲ Tex., El Paso—HOSPITAL, Hotel Dieu, c/o Sister Mathilde, El Paso, 4 story, former hospital, addn. to, Robert E. McKee, G. C., Drawer 562. $1,346,000. Bids 4-19. CD 4-20, under LB.

▲ Tex., Houston—DWELLINGS—Atlantic Housing Corp., 2201 Commerce St., 100 dwellings, Owner builds. Approx. $1,200,000. CD 5-4.

▲ Tex., Houston—DWELLINGS—Chocolate Bayou Estates, c/o W. E. Robertson Sr., 1537 Dunlavy St., Sect. 1, 100 dwellings, to Robertson Constr. Co., 1537 Dunlavy St. Approx. $1,150,000. CD 5/8.

▲ Tex., Houston—OFFICE—Jesse H. Jones, Chronicle Bldg., 15 story, former office to Manufacturers Constr. Co. of Texas, 2928 Preston St. $1,269,617. Bids 5-23, awarded 5-24. CD 5-24.

▲ Wis., Milwaukee—SHOPPING CENTER, Fitzgerald Enterprises, c/o Bldg. N, Pilgrim Rd., Zone 12, general contractor, Capitol Dr. and Port Washington Rd., 150x410 ft., steel frame and brick, brick shopping center, 60x150 ft., steel frame and brick, to F. H. Krueger & Sons, W. Fond du Lac Ave., Zone 10. $2,500,000.

▲ Alaska—Anchorage—APARTMENT—A. C. Swarthout, Administrator of T. Healy Tot Spencer Jr., Healy, Alaska, 134 unit apartment, 12x12 ft. units, Turnagain Heights, Owner builds. $1,600,000. P. L. McDonald, 1554 University Ave., Berkeley, Calif., architect.

INDUSTRIAL BUILDINGS

BIDS ASKED

Tenn.—Athens—WAREHOUSE, U.S.A. Steel Products Co., 120 E. 41 St., New York, N. Y., to build 60x[illegible] warehouse on Mayfield Rd., Athens. Approx. $60,000. Owner builds. CD 5-24.

Conn.—Stamford—WAREHOUSE, Stamford Warehouse Co., 1 Selleck St., Stamford, 1 story, 100x400 ft., steel frame and brick, warehouse, Selleck St. and Railroad Pl., to Atlantic Building Co., 1 Selleck St., Stamford. $[illegible]. Owner builds. CD 5-24.

N. Y., Brooklyn—FACTORY, Adler Shoe Co., 1 Selleck St., New York, N. Y., 1 story, 100x400 ft., steel frame and brick, factory, Selleck St. and Railroad Pl., to Atlantic Building Co., 1 Selleck St., Stamford. $[illegible]. Owner builds. CD 5-24.

CONTRACTS AWARDED

▲ Conn., Stamford—WAREHOUSE, Stamford Warehouse Co., 1 Selleck St., Stamford, 1 story, 100x400 ft., steel frame and brick, warehouse, Selleck St. and Railroad Pl., to Atlantic Building Co., 1 Selleck St., Stamford. $4,750,000.

▲ Fla., Palatka—PLANT, Ordway Tile & Brick Co., Palatka, 1 story, 100x400 ft., steel frame and brick, plant, to Atlantic Building Co., 1 Selleck St., Stamford. $[illegible]. Owner builds. CD 5-24.

▲ O., St. Marys—PLANT, Ohio Match Co., 1 Selleck St., New York, N. Y., 1 story, 100x400 ft., steel frame and brick, plant, to Atlantic Building Co., 1 Selleck St., Stamford. $[illegible]. Owner builds. CD 5-24.

▲ Pa., Pittsburgh—PLANT, Jones & Laughlin Steel Corp., 3 and Ross Sts., general contract e. Jones & Laughlin steel plant, Second Ave. to Second Ave. and Chessler Exp., Aliquippa, foundation to Marvin Knudsen Co., Box 436, Bowie, Texas. Total est. cost $42,000,000. CD 3-17-49.

UNCLASSIFIED

BIDS ASKED

+ Illinois—POWER LINE AND SUBSTATION—C. A. Bresler Co., King Mfg. Co., Court House & Custom House Pl., Chicago, Ill., 138 kv power line and substation to serve Canton's power station, East Side Levee and Sanitary Dist., from Illinois to Fulton County, Ill. Owner. CD 2-24-50.

Kan., Atchison—SWIMMING POOL—B.A. 6/1—Bd. Regents, National Bank of Topeka Bldg., Topeka. Indoor swimming pool at State Orphans Home. $65,000. C. L. Mansfield, 2022 Topeka Blvd., Topeka. CD 9-27-49.

+ Me., Eastport—WHARF—B. A. 6/1—U. S. Eng. Army, Rm. 804, Bldg. 32, Misc. reconstructing wharf at Treat Island, Eastport. LVENG 24-616-50-67.

Missouri—RURAL DISTRIBUTION LINES—B.A. 6/1—Southwestern Electric Power Co., Shreveport, La., Marion Electric Cooperative, Inc., Marion, Ill., 69 kv, 3 ph, 60 cy, 3 wire, 4 miles and one steel structure 22.7-2.12.5 kv substation, Marion and Dillon Counties. Plans deposit $10. J. B. McCreary Eng. Corp., 1403-22 Marietta Street Bldg., Atlanta, Ga. engrs. CD 6-24-48.

Tex., Port Neches—TANK—B.A. 6/1—Port Neches Independent School Dist., Port Neches, 2,500 seating steel grandstand, tennis courts. $175,000. Herbert Vickers & Assoc., 2506 Fort Worth Nat. Bank Bldg., Fort Worth, archts. CD 4-24-50.

Tex., Stephenville—ELECTRIC DISTRIBUTION SYSTEM—B.A. 6/1—A. & M. College, College Station, revisions and additions, extend electric distribution system, heating plant for Finley and Yesterwood Halls, for John Tarleton State College, Stephenville. $85,000. Plans deposit $25. Wyatt C. Hedrick, 1306 First Nat. Bank Bldg., Fort Worth, engr. and archt.

+ Washington—STATION—B.A. 6/1—D. C. Eng. Office, Municipal Way, Seattle, Zone 4, construct Municipal Way, Seattle, Zone 4, construct [illegible] sewer, [illegible] Ave. to [illegible] Ave., [illegible] sewer, [illegible] Ave. to [illegible] Ave., [illegible] sewer, [illegible] Ave. to [illegible] Ave.,

CONTRACTS AWARDED

OFFICIAL PROPOSALS

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (in duplicate) will be received at the Bureau of Reclamation, Region No. 4, Box 2511, Denver 1, Colorado, until 10:00 a.m., June 13, 1950, and then publicly opened and read, for furnishing labor and materials and performing all work for the construction of [illegible] Nebraska, Missouri River Basin Project. The work includes the excavation of approximately 1,000,000 cubic yards of earth and rock, the placing of approximately 1,000,000 cubic yards of earth and rock fill, the placing of approximately 1,000,000 cubic yards of earth and rock fill, the placing of approximately 1,000,000 cubic yards of earth and rock fill

OFFICIAL PROPOSALS

(Continued from page 105)

Bids: June 1, 1950. (7416)

State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway & Canal Law, as amended and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A. M., advanced standard time, which is nine-thirty o'clock A. M., eastern standard time on Thursday, June 1, 1950 by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects. Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 220 Broadway, New York City.

The deposit for plans and proposal forms for each contract is indicated below. A refund will be made in full to bidders for this return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1				
		G. L. Narkavus, Dist. Engr., 338 Broadway, Albany, N. Y.				
Schenectady	FAS 50-4	Pangburn Road, Pt. 3, 4 & 2-05—Asph. Conc. Surf. on Alpha Road	1A, Asph. Conc. Base, Cut & Fill, Drainage Structures		$12.000 Plans $10	$227,000
Warren and Essex	FAR 50-15 FAH 50-7	Hague-Tanglewood—N. H. S. 73 to Pt. 1 & Int. Trans. Schroon Village, Pt. 2 Project 150-2, F&T-1	8.73	Asph. Conc. Surf. on Alpha Base	1A, Alpha Bit. Base, Alpha Bit. Base	$35,000 Plans $25	$786,000
Schenectady and Schoharie	FAR 50-18	Duanesburg-Sloansville—Int. Trans. Duanesburg, Pt. 1 & Int. Trans. Sloansville, Pt. 2 Project 150-1, F&T-1	10.00	Asph. Conc. Surf. on Alpha Base	1A, Alpha Bit. Base, Cut & Fill, Drainage Structures	$47,000 Plans $25	$551,000
		DISTRICT No. 2					
		J. Kennedy, Dist. Engr., 100 No. Jerome St., Utica, N. Y.					
Herkimer	U. S. #20	Raising the superstructure and lowering Concrete sill of the Feeder Canal over Canal Street Bridge at Ilion (partly in the Town of Danube, Herkimer County, and submitted in Duplicate, signed Proposals)	Reconstruction of Double Guard Gates		5% of bid Plans $10		None
		DISTRICT No. 3					
		Wm. Rousseau, Dist. Engr., 161 W. Water St., Syracuse, N. Y.					
Onondaga and Onondaga	M-93	Marcellus-Dan Candlelight—Onesia Road	7.7	Earth and Rock Fill	$28,000 Plans $10		$340,588
		DISTRICT No. 4					
		C. R. Werren, Dist. Engr., 65 Court St., Buffalo, N. Y.					
Cattaraugus	FC 50-1	Portville-Olean—S. H. #52 & 10 Main St. Bridge over Dodge Creek	10.09	Conc. Conc. Pvt. Conc. Base, Conc. Bridge Work, Conc. Box Culvert	$6,000 Plans $10		$112,000
		DISTRICT No. 6					
		F. W. Dryvers, Dist. Engr., 71 Frederick St., Binghamton, N. Y.					
Broome	FAC 50-6	Binghamton-Conklin—Conklin Ave. & Front St. Extension to Jct. Route 11	0.00	Asph. Conc. Surf. on Asph. Conc. Base	2A, Asph. Conc. Base, Cut & Fill, Drainage Structures	$40,000 Plans $15	$507,000
Broome	FAS 50-3	Johnson Bridge & Approaches—Reg. #420	0.15	Asph. Conc. Surf. on Asph. Conc. Base, 180 span Reg. Type with 60 Deck Approaches	1A, Asph. Conc. Base, Cut & Fill, Drainage Structures	$11,000 Plans $10	$101,000
		DISTRICT No. 10					
		J. J. Dorn, Dist. Engr., Mattituck Bay at Little E. Neck Rd., Riverhead, L. I., N. Y.					
Suffolk	27-50-1	Suffolk Co. Route #58 to Jct. Route #25	2.7	Asph. Conc. Surf. on Asph. Conc. Base	2A, Asph. Conc. Base, Cut & Fill, Drainage & Misc. Work	$13,000 Plans $15	$202,000
		DISTRICT No. 8					
		J. F. Bard, Dist. Engr., Pleasant Valley Rd., Poughkeepsie, N. Y.					
Westchester and Bronx	BRF 50-3	Bronx River Parkway, Lower 2 sections (Sections 1 & 2, Cross County Parkway)	2.80	8" Conc. Pvt. Conc. Base, 22" R.C.P. and 24" C.M.P. Culverts, Bituminous Surface Treatment, Steel Beam Bridges, Steel Plate Beam Bridges, Steel Girder Bridges, Steel Plate Girder Bridges, Steel Rigid Frame Bridges, Steel Arch Bridges, Steel Through Truss Bridges, Steel Deck Truss Bridges, Steel Through Plate Girder Bridges, Steel Deck

U. S. Government
(Continued from page 106)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. 2622) will be received by Bureau of Reclamation, Redding, California, June 15, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of approximately 3 miles of Shasta Dam-Keswick Drainage Tunnel, Shasta County, California. The work is located 10 miles north of Redding, California. Principal items are approximately 7,700 lin. ft. excavation, 6,600 cu. yds. concrete, 1,100 tons reinforcing steel, and other work. Bidding documents may be obtained from the Regional Director, Bureau of Reclamation, Federal Office Building, Sacramento 14, California, or from the Bureau of Reclamation, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(C50)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. 2623) will be received by Bureau of Reclamation, Casper, Wyoming, June 15, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of Thermopolis Distribution System, Wyoming, Missouri River Basin Project. The work is located at Thermopolis, Wyoming. Principal items are approximately 25 miles of canals, 240 miles of laterals, 2 concrete siphons, 2 concrete structures, and installation of pumping and other miscellaneous mechanical and electrical equipment, concrete lining and other work. Time allowed for completion will be 353 days. For particulars address Bureau of Reclamation, Casper, Wyoming, or Building 1, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(C50)

OFFICIAL PROPOSALS

Dated: June 8, 1950 (C60)

Pavement Subsealing & Repairs

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for

ROUTE 25, SECTION 2F

For concrete subsealing and repairs on Route 25, Section 2F, from Mountain Avenue to Washington Avenue, Township of Green Brook and Bridgewater and Borough of Bound Brook, Somerset County, Federal Project FI-(XXX), Length 2.761 miles.

Estimated

- 5,000 sq. yds. Pavement Excavation
- 11,000 sq. yds. Reconstruct Shoulders
- 12,000 gals. Bituminous Shoulder Surface Treatment
- 5,000 sq. yds. Re-Seal Cracks, Pavement Surface
- 287,000 gals. Asphaltic Cement for Subsealing
- 12,000 units Holes Drilled through Pavement

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Thursday, June 8, 1950 at ten o'clock (10:00 A.M. EASTERN STANDARD TIME), eleven o'clock (11:00 A.M. DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The award and contract are subject to the approval of the bidder's qualifications in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a sworn financial statement and statement of plant and equipment.

NOTE: The proposed project is a Federal Aid Project authorized by the provisions of Title 23 of the Revised Statutes of New Jersey and supplements and by Section 1, Public Laws 834, 80th Congress, and is to be performed in accordance with the special provisions and requirements of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications which provisions require that labor be employed from lists furnished by the State Employment Service, 1060 Washington Street, Newark, N. J. The attention of bidders is directed to the special provisions covering subletting of the contract and the minimum wages paid to all classes of labor that are to be employed on this contract. The minimum wages paid to all classes of labor that are to be employed on this contract shall be $1.25 per hour.

Drawings, specifications and forms of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Copies will be furnished on application to A. Lee Eastwood, Chief Clerk, State Highway Department, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard specifications of the State Highway Department and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for ten per cent (10%) of the amount of the bid, provided that the amount of such check shall not be less than $2,000.00 and not more than $20,000.00. Checks of the three lowest bidders will be returned on approval of proposal forms to the award, checks of unsuccessful bidders will be returned forthwith after the opening of bids, and checks of successful bidders will be returned upon the execution of the contract and bond. Checks must be made payable to the order of the Treasurer of the State of New Jersey and must be drawn on a bank or trust company located and authorized to do business in this State. Cash will not be accepted in lieu of a certified check.

Dated: June 8, 1950 (C60)

Widening of Bridges

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for

ROUTE 25, SECTION 4-B, BRIDGES
(WIDENING)

For the Widening of Bridges at Nassau Street, Magazine Street, St. Charles Street, Roanoke Avenue, C.R.R. of N.J., Mangin Street Branch, and Passaic River Branch, and Passaic Street, Section 4B, in the City of Newark, Essex County, Federal Project No. BI-(XXX), The principal items of construction are:

- 500 tons Concrete in Structures
- 2,000 tons Structural Steel
- 20,000 lbs. Reinforcing Steel in Structures

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Thursday, June 15, at ten o'clock (10:00 A.M. EASTERN STANDARD TIME), eleven o'clock (11:00 A.M. DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The award and contract are subject to the approval of the bidder's qualifications in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a sworn financial statement and statement of plant and equipment.

NOTE: The proposed project is a Federal Aid Project authorized by the provisions of Title 23 of the Revised Statutes of New Jersey and supplements and by Section 1, Public Laws 834, 80th Congress, and is to be performed in accordance with the special provisions and requirements of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications which provisions require that labor be employed from lists furnished by the State Employment Service, 1060 Washington Street, Newark, N. J. The attention of bidders is directed to the special provisions covering subletting of the contract and the minimum wages paid to all classes of labor that are to be employed on this contract. The minimum wages paid to all classes of labor that are to be employed on this contract shall be $1.25 per hour.

Drawings, specifications and forms of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Copies will be furnished on application to A. Lee Eastwood, Chief Clerk, State Highway Department, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard specifications of the State Highway Department and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for ten per cent (10%) of the amount of the bid, provided that the amount of such check shall not be less than $2,000.00 and not more than $20,000.00. Checks of the three lowest bidders will be returned on approval of proposal forms to the award, checks of unsuccessful bidders will be returned forthwith after the opening of bids, and checks of successful bidders will be returned upon the execution of the contract and bond. Checks must be made payable to the order of the Treasurer of the State of New Jersey and must be drawn on a bank or trust company located and authorized to do business in this State. Cash will not be accepted in lieu of a certified check. Bids must be accompanied by a certified check drawn to the order of the Treasurer of the State of

(Continued on page 108)

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New Jersey for not less than ten per cent (10%) of the bid, provided that the said certified check shall not be less than $2,000.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special agreement covering the work may be obtained upon application to the undersigned and must be submitted with the bid. The right is reserved to reject any or all bids.

Dated: June 8, 1950 (C60)

Road Overpass

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for

ROUTE 4, SECTION 2
BRIDGE ON ROUTE OVERPASS

For the Construction of a Reinforced Concrete Bridge & Approaches

Estimated

- 1,000 cu. yds. Concrete in Structures
- 100,000 lbs. Reinforcing Steel

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Thursday, June 15, at ten o'clock (10:00 A.M. EASTERN STANDARD TIME), eleven o'clock (11:00 A.M. DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The award and contract are subject to the approval of the bidder's qualifications in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a sworn financial statement and statement of plant and equipment.

NOTE: The proposed project is a Federal Aid Project authorized by the provisions of Title 23 of the Revised Statutes of New Jersey and supplements and by Section 1, Public Laws 834, 80th Congress, and is to be performed in accordance with the special provisions and requirements of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications which provisions require that labor be employed from lists furnished by the State Employment Service, 1060 Washington Street, Newark, N. J. The attention of bidders is directed to the special provisions covering subletting of the contract and the minimum wages paid to all classes of labor that are to be employed on this contract. The minimum wages paid to all classes of labor that are to be employed on this contract shall be $1.25 per hour.

Drawings, specifications and forms of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Copies will be furnished on application to A. Lee Eastwood, Chief Clerk, State Highway Department, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard specifications of the State Highway Department and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for ten per cent (10%) of the amount of the bid, provided that the amount of such check shall not be less than $2,000.00 and not more than $20,000.00. Checks of the three lowest bidders will be returned on approval of proposal forms to the award, checks of unsuccessful bidders will be returned forthwith after the opening of bids, and checks of successful bidders will be returned upon the execution of the contract and bond. Checks must be made payable to the order of the Treasurer of the State of New Jersey and must be drawn on a bank or trust company located and authorized to do business in this State. Cash will not be accepted in lieu of a certified check. Bids must be accompanied by a certified check drawn to the order of the Treasurer of the State of

(Continued on page 108)

OFFICIAL PROPOSALS
(Continued from page 107)

Constructing Shaft for Relief Tunnel

COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN DISTRICT COMMISSION

Sealed proposals will be received at the office of the Metropolitan District Commission, 20 Somerset Street, Boston, Mass., until 1:00 P.M., Eastern Daylight Saving Time, Thursday, June 15, 1950, and then publicly opened for Contract 196 for constructing Shaft 2 of the South Metropolitan Relief Tunnel of the Metropolitan Sewerage District in the City of Chelsea, Mass. Shaft 2 will be about 240 feet deep and mainly about 14 feet in diameter after lining. The work consists of excavating and lining the shaft and excavating about 250 feet of tunnel each way from the shaft. One of the tunnel headings will be approximately 14½ feet in diameter and the other approximately 12½ feet in diameter, unlined. Each bidder shall deposit each of a certified check or security in an amount not less than $12,000. A bond in at least the full amount of the contract will be required of the successful bidder to secure the faithful performance of the contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. Special attention is called to the requirements as to the hours of employment to be observed and to the minimum rates of wages prescribed by the State Commissioner of Labor and Industries. A schedule of such rates may be obtained at the office of the Metropolitan District Commission. The information for bidders, form of proposal, form of contract, bond, and forms and regulations may be examined at the above address and copies thereof obtained from Karl R. Kennison, Chief Engineer of the Construction Division, upon the deposit of $20.00 to be refunded upon the bidder's or other interested party's return, after award of contract, of the specifications and drawings. The site of the work and the existing conditions at and near the shaft site may be seen by applying at the office of the Commission. The Commonwealth reserves the right to waive any informality in or reject any or all proposals. No bidder may withdraw his bid within thirty days after the actual date of the opening thereof. A proposal which includes conditions not called for by the specifications may be rejected as informal.

WILLIAM T. MORRISEY
Commissioner

May 16, 1950

Eng. News-Rec. June 8, 1950 (7581)

Construction of Haddon Avenue

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner at

HADDON AVENUE
Construction of Haddon Avenue from Cuthbert Boulevard to Terrace Road in Delaware River Bridge Toll Bridge Approach of Haddonfield-Camden Federal Aid Highway Project No. 8-F(21), Length 1.0 mile

Estimated
Light Structural Steel ... 22,000 lb
Reinforcing Steel ... 2,100,000 lb
Structural Steel ... 2,200,000 lb
Concrete ... 22,000 cu yd

Proposals will be received at the office of the State Highway Department, Room 1, State House Annex, Trenton, New Jersey, until 10:00 A.M. (EST) on the same date at which time and place said proposals will be publicly opened and read.

The receipt and opening of proposals for this project are subject to the conditions contained in the "Instructions to Bidders" adopted by the New Jersey State Highway Department.

Bidders must also submit with their proposal a revised financial statement and a statement of plant and equipment which they propose to use on the work, as of May 1, 1950.

Copies of the proposal forms, plans and specifications may be obtained at the office of the State Highway Department, Room 1, State House Annex, Trenton, New Jersey, upon application to the Chief Engineer. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application. A. Lee Greene, Chief Engineer, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the Standard State Highway Specifications and must be enclosed in sealed envelopes addressed to the party receiving the bids and the envelopes bearing the name and address of the bidder and work for which the bid is submitted. Each proposal must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that such check for a bid of more than $100,000 but not more than $200,000 shall be in the sum of $10,000 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special attention is called to the requirements as to the hours of employment to be observed and to the minimum rates of wages prescribed by the State Commissioner of Labor and Industries. A schedule of such rates may be obtained at the office of the Commissioner. The Commissioner reserves the right to waive any informality in or reject any or all proposals. No bidder may withdraw his bid within thirty days after the actual date of the opening thereof. A proposal which includes conditions not called for by the specifications may be rejected as informal.

Dated: June 1, 1950

Secretary, State Highway Commissioner

Eng. News-Rec. June 8, 1950 (7580)

New Jersey Turnpike Authority

Sealed proposals will be received by the New Jersey Turnpike Authority for

CONTRACT NO. 21

The work to be performed under this contract involves two underpass bridge structures and incidental work at U. S. Route 1 and 22 in connection with the construction of the New Jersey Turnpike between Woodbridge and Newark, Essex County, New Jersey.

Principal items of work for the Contract include:

Foundation Excavation (mostly rock) ... 45,000 cu yd
Reinforcement Steel ... 2,200,000 lb
Structural Steel ... 2,200,000 lb
Concrete ... 22,000 cu yd

Proposals will be received at the office of the New Jersey Turnpike Authority, 60 Broad Street, Trenton 8, New Jersey, until 12:00 noon (D.S.T.) on June 15, 1950, at which time and place said proposals will be publicly opened and read.

The receipt and opening of proposals for this project are subject to the conditions contained in the "Instructions to Bidders" adopted by the New Jersey Turnpike Authority. Bidders must also submit with their proposal a revised financial statement and a statement of plant and equipment which they propose to use on the work, as of May 1, 1950.

Copies of the proposal forms, plans and specifications may be obtained at the office of the New Jersey Turnpike Authority, 60 Broad Street, Trenton 8, New Jersey, upon application to the Chief Engineer. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application. A. Lee Greene, Chief Engineer, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the Standard State Highway Specifications and must be enclosed in sealed envelopes addressed to the party receiving the bids and the envelopes bearing the name and address of the bidder and work for which the bid is submitted. Each proposal must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that such check for a bid of more than $100,000 but not more than $200,000 shall be in the sum of $10,000 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special attention is called to the requirements as to the hours of employment to be observed and to the minimum rates of wages prescribed by the State Commissioner of Labor and Industries. A schedule of such rates may be obtained at the office of the Commissioner. The Commissioner reserves the right to waive any informality in or reject any or all bids.

Dated: June 1, 1950

Secretary, State Highway Commissioner

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address of the bidder and the number of the Contract on the outside, and must be accompanied by a certified check drawn to the order of the New Jersey Turnpike Authority and a proposal bond, each for not less than five (5) percent of the amount of the proposal, but not less than $5,000 nor more than $200,000, and must be delivered at the above place on or before the above hour. Copies of the proposal form to be used for submitting proposals, of the form for proposal bond, of the form to be used for financial statement and plant and equipment statement to be submitted with proposal, and special addressed envelopes furnished to bidders may be obtained from the Chief Engineer.

The Contract will be awarded or proposals rejected within fifteen (15) days from the date of opening proposals. The right is reserved to reject any or all proposals.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast
Chairman

May 17, 1950

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (specification No. 7529) will be received by Bureau of Reclamation, Phoenix, Arizona, until 10:00 A.M., and then publicly opened for furnishing labor and materials and performing all work for the construction of Tucson Aqueduct, Davis Dam Project, Arizona-Nevada. The work is situated 1 mile northwest of Tucson, Ariz. Principal items are approximately: Schedule 1, excavation, 1,000,000 cu yd; concrete lining, 150,000 cu yd; concrete, miscellaneous structural steel, 1,000,000 lb; reinforcing steel, 6,000,000 lb. Schedule No. 2, excavation for installation of electrical equipment and miscellaneous and other work. Time allowed for completion will be 550 days. For particulars address Bureau of Reclamation, Boulder City, Nev., Post Office Box 427, Phoenix, Ariz., or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

(7551)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (specification No. 7530) will be received by Bureau of Reclamation, Custer Dam, Washington, June 15, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of Quincy Pumping Plant, Columbia Basin Project, Washington. The work is located between C and 7 miles east of Quincy, Washington. Principal items are approximately: 47,000 cu yd of common excavation, 3,650,000 cu yd of rock excavation, 27,000 cu yd of backfill, 161,000 lb of reinforcement bars, 1,250 cu yd of concrete and 700,000 lb of pump discharge pipe and structural steel and other work. Time allowed for completion will be 650 days. For particulars address Bureau of Reclamation, Ephrata, Washington, or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

(7554)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (specification No. 7531) will be received by Bureau of Reclamation, Denver, Colorado, June 13, 1950, and then publicly opened for furnishing one 125-ton stiff-leg, motor-operated traveling crane for Green Peter Power Plant, Helena-Great Falls Division, Green Peter-Foster Dam, Montana, Missouri River Basin Project. Delivery desired within 60 days. For particulars address Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

(7553)

(Continued on page 109)

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(Continued from page 108)

(7589)

New Jersey Turnpike Authority

Sealed proposals will be received by the New Jersey Turnpike Authority for the following contracts:

CONTRACT NO. 23

The work to be performed under this Contract involves the construction of eight (8) steel and concrete structures and appurtenant work in connection therewith and incidental work in connection with the construction of the New Jersey Turnpike, Section 4, between Aberdeen and the Raritan River, in Mercer and Middlesex Counties, New Jersey.

Principal items of work include: Open Foundation Excavation, 3,500 Cu. Yds.; Concrete, 19,220 Cu. Yds.; Reinforcement Steel, 1,920,000 Lbs.; Structural Steel, Superstructure, 1,200,000 Lbs.; Structural Steel, Substructure, 1,500,000 Lbs.; Concrete Bearing Piles, 22,500 Lin. Ft.; Bearing Piles, 2,500 Lin. Ft.; Timber Bearing Piles, 1,500 Lin. Ft.; Steel Sheeting, 1,500 Lin. Ft.; Timber Sheeting, 1,500 Lin. Ft.; Steel Piles, 1,500 Lin. Ft.

Contract documents may be seen, and may be inspected by prospective bidders during office hours, on and after May 15, 1950 at the office of the New Jersey Turnpike Authority, 60 Prospect Street, Trenton, New Jersey, and at the office of the Engineers, De Leuw, Cather & Company, 15 Mercer Street, Hightstown, New Jersey.

Contract documents will be furnished for $5.00 for each set upon application to the Authority. The payment will not be refunded and contract documents are not required to be returned.

• • •

CONTRACT NO. 24

The work to be performed under this Contract includes the construction of 17 concrete and steel bridge structures, reconstruction and paving of approach roads and grading and drainage of a superelevation change area.

Part of the work is in the Township of Raritan and Woodbridge, New Jersey, in various sections of the southern section of Section 5 of the New Jersey Turnpike from Sta. 57+00 at the Raritan River to Sta. 90+00 in Woodbridge.

Maintenance of traffic over the old national highway (Route 25) and old railroad must be provided. The completion date is July 1, 1951.

Principal items of work are:

Earth Excavation, 130,000 Cu. Yds.; Borrow Excavation, Common, 105,000 Cu. Yds.; Foundation Excavation, Open, 3,000 Cu. Yds.; Concrete, Bridge Structures, 9,000 Cu. Yds.; Structural Steel, 2,000,000 Pounds; Steel for Concrete Bearing Piles, 600,000 Lbs.; Reinforcement Steel, 2,500,000 Pounds; Miscellaneous Concrete, 1,000 Cu. Yds.; Paving, Concrete and Bituminous, 30,000 Sq. Yds.; Topsoiling, 30,000 Sq. Yds.; Timber Piles, Various, Treated and Untreated, 100,000 Lin. Ft.; Guard Rail, 10,000 Lin. Ft.; Guide Rail, 10,000 Lin. Ft.; Chain Link Fence, 10,000 Lin. Ft.

Contract documents may be seen, and may be inspected by prospective bidders during office hours, on and after May 15, 1950 at the office of the New Jersey Turnpike Authority, 60 Prospect Street, Trenton, New Jersey, and at the office of the Engineers, Maguire, Shanahan & Eglin, 1 Beacon Street, Massachusetts, and 25 Livingston Avenue, New Brunswick, New Jersey.

Contract documents, exclusive of specifications, will be furnished for $10.00 per set upon application to the Authority. The payment will not be refunded and contract documents are not required to be returned. Plans showing grading, drainage and bridges may be examined at the office of the Authority or at the New Brunswick office of the Engineers.

• • •

CONTRACT NO. 25

The work to be done under this Contract involves the construction of 14 miles and includes the following principal items of work: Incidental grading, drainage and paving in connection with the construction of the New Jersey Turnpike, Section 5, between Monmouth and Middlesex, in Burlington and Mercer Counties, New Jersey.

Principal Items of Work for Contract No. 25 include:

Roadway Excavation, Earth, 231,575 Cu. Yds.; Rock Excavation, 232,850 Cu. Yds.; Open Foundation Excavation (Wet and Dry), 9,485 Cu. Yds.; 4" Topsoiling, 26,260 Sq. Yds.; Cast-in-Place Concrete, Piles,

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25,858 L.F. Concrete Various Depth, 11,451 Cu. Yds.; Reinforcement Steel, 1,127,000 Lbs.; Structural Steel, 2,360,000 Lbs.; Storm Drain, various types and sizes, 4,121 L.F.; Guard Rail, 2,620 L.F.; Median Barrier, 1,000 L.F.; and 8 Ea. Sq. Ft. Modified Precipitator Manhole Underpass Structure, 52,000 Sq. Yds.; Mixed Type Pavement, 42,000 Sq. Yds.; Gravel Surface Course, 61,224 Sq. Yds.; Bituminous Surface Treatment, 56,111 Sq. Yds.

Contract documents will be prepared for each bid such set upon application to the Authority. The payment will not be refunded and contract documents are not required to be returned.

Contract documents may be seen and may be inspected by prospective bidders during office hours on and after May 15, 1950 at the office of the New Jersey Turnpike Authority, 60 Prospect Street, Trenton, New Jersey, and at the office of the Engineers, Parsons, Brinckerhoff, Hall & MacDonald, 52 Broadway, New York, New York.

• • •

Proposals will be received at the office of the New Jersey Turnpike Authority, 60 Prospect Street, Trenton, New Jersey, up to the following dates and hours: Until 11 A.M. D.S.T. and thereafter in the Veterans Room of the War Memorial Building, Masonic Temple, at Willow Street, Trenton, New Jersey, until the 11 A.M. D.S.T. each of the following dates and hours, at which time and place said proposals will be publicly opened and read: Contract No. 23 — June 1, 1950; Contract No. 24 — June 1, 1950; Contract No. 25 — June 1, 1950.

The receipt and opening of proposals is subject to proper prequalification of bidders in accordance with regulations adopted by the New Jersey Turnpike Authority.

Bidders must be prequalified with their proposals. Prequalification will be based upon a certified statement of financial responsibility, plant and equipment.

Proposals must be made upon the standard forms of the Authority, and in accordance with the Standard Specifications for Construction of the New Jersey Turnpike, and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and the number of the Contract on the outside and must be accompanied by a certified check drawn to the order of the Treasurer, New Jersey Turnpike Authority, or a proposal bond, each for not less than 10 per cent of the amount of the proposal but not to exceed $50,000.00. Each bidder will be required at the time fixed for the opening of proposals to file a statement showing his financial responsibility, experience in highway construction, and plant and equipment available for the work contemplated. Forms for such statement and proposals are furnished to detailed plans and specifications and all information required by the bidder may be secured from the Authority.

Contracts will be awarded or proposals rejected within fifteen (15) days from the date of opening proposals. The right is reserved to reject any or all proposals.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman

May 12, 1950

(7587)

State Road Work

Sealed proposals will be received by the State Highway Department, at the office, [illegible] Delaware, until 2:00 P.M. (D.S.T.) (1:00 P.M. E.S.T.) June 7, 1950, and at that time and place publicly opened and read, for grading, draining, paving, bituminous surface treatment, and appurtenant work on

CONTRACT 1067
SLAUGHTER BEACH SHOALS
ELIMINATION
SLAUGHTER BEACH
Sussex County, Delaware

Route C-Y, Sand Beach Fill

CONTRACT 1068
CREOSOTED TIMBER GROINS
AND BULKHEAD
BROADKILL BEACH
Sussex County, Delaware

[illegible] M. Ft. B.M. Creosoted Timber Structures
[illegible] L. F. Creosoted Timber Piles
[illegible] M Ft. B.M. Creosoted Timber Sheet Piles

CONTRACT 1069
CREOSOTED TIMBER GROINS
AND BULKHEAD
LEWES BEACH
Sussex County, Delaware

[illegible] M Ft. B.M. Creosoted Timber Structures
[illegible] L. F. Creosoted Timber Piles

OFFICIAL PROPOSALS

[illegible] M. Ft. B.M. Creosoted Timber Sheet Piles

CONTRACT 1066
STONE FILLED CREOSOTED
TIMBER GROINS
REHOBOTH BEACH
Sussex County, Delaware

[illegible] M Ft. B.M. Creosoted Timber Structures
[illegible] L.F. Creosoted Timber Piles
[illegible] M Ft. B.M. Creosoted Timber Sheet Piles

CONTRACT 1067
STONE FILLED CREOSOTED
TIMBER GROINS
BETHANY BEACH
Sussex County, Delaware

[illegible] M Ft. B.M. Creosoted Timber Structures
[illegible] L.F. Creosoted Timber Piles
[illegible] M Ft. B.M. Creosoted Timber Sheet Piles

CONTRACT 1065
[illegible] Removal of Existing Groin Cells
Sussex County, Delaware

The final report, Agreement, Performance Bond and Payment Bond will be due on the above mentioned contracts on or before the date specified in the Special Provisions.

Attention is called to the Special Provisions in the proposal, specifically as to:

Definition of contract bid quantities.
Method of payment for work performed.
Method of payment for materials furnished.
Liquidated damages.

Bidders are advised that the State of Delaware is exempt from the payment of Federal Excise Taxes.

Bidders are required to submit with their proposals a certified check, cash or acceptable bidder's bond for not less than 10% of the amount of the proposal.

Plans and specifications may be examined at the office of the Department of Highways and Transportation, Dover, Delaware, and at the office of the Resident Engineer, Georgetown, Delaware.

Proposal forms and specifications may be obtained from the Department of Highways and Transportation, Dover, Delaware, upon payment of $1.00 for each Contract. Plans will not be furnished but may be examined at the office of the Resident Engineer, Georgetown, Delaware.

Bidders are required to submit with their proposals a certified check, cash or acceptable bidder's bond for not less than 10% of the amount of the proposal.

The successful bidder will be required to furnish a performance bond in the amount of the contract.

Payments will be made monthly as the work progresses on the basis of estimates prepared by the Engineer.

Each proposal must be accompanied by

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)
$1.20 cents a line, minimum 4 lines. To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, $1.00 a line an insertion.

INFORMATION:
BOX NUMBERS care publication New York, Chicago or San Francisco offices count as 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by June 5th at the New York Office 330 W. 42 St., N. Y. 18, will appear in June 15th issue subject to space available

---

SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection commensurate with the undersigned. We offer the original personal employment service (to many exacting and reputable clients) for the procedure, of highest ethical standards, is individualized to your personal requirements and designs ventures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N. Y.

CONSTRUCTION PERSONNEL

Executives, general superintendents, engineers, foremen, mechanics, and all skilled personnel linked with construction, heavy industrial, earth moving, marine, petroleum, etc. Is possible financial aid for their relocation in the U. S. and Foreign countries temporarily, without notice, your present employment.

FOREIGN SERVICE BUREAU
P. O. Box 295 Metuchen, N. J.

To EMPLOYERS who advertise for MEN:

WHEN there are many applicants for a single position it frequently happens that the only letters acknowledged are those of the most promising candidates. Others may not receive any indication that their letters have even been received by a prospective employer, much less given consideration. These men often become discouraged, will not respond to future advertisements, and sometimes question their honorable character.

Every advertisement printed in the Searchlight Section is duly authorized.

It will help to keep our readers interested in this advertising if you will acknowledge every application received, even if you merely return the letters of unsuccessful applicants with "Position filled, thank you" written or stamped on them. If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of cooperation between employers and the men replying to Positions Vacant advertisements.

"Put yourself in the other fellow's place."

Classified Advertising Division
McGraw-Hill Publishing Co., Inc.

REPLIES: Box Nos. Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

CIVIL SERVICE

MECHANICAL ENGINEER—for work in State Public Works Department. Experience required in power plant design, H.S.D. degree preferred or equivalent. Five (5) years experience with two (2) in responsible charge. Civil service $4,200—$5,100 per year, plus overtime. Give education and date of availability. P-6567, Engineering News-Record.

POSITIONS VACANT

CONSTRUCTION ENGINEER for general contracting firm specializing in highways. Must be able to prepare estimates, handle construction surveys and layout of job records. Reply stating experience, salary desired, date available. The Grandview Construction Corp., 210 South Fulton Avenue, Mount Vernon, New York.

CONSTRUCTION COMPANY operating nationwide specializing in structural concrete such as bridge piers and other foundations and excavation such as dams, tunnels, A.S.C.E. construction engineer and estimator capable of planning and layout including forms and economical handling of materials. To be considered, complete information must be furnished. Top salary and bonus to right man. Box P-6541, Engineering News-Record.

ESTIMATOR—FOR Pittsburgh industrial contracting firm specializing in structural steel, including plate work and tanks. Must have knowledge of estimating and salary expected. Write P-6421, Engineering News-Record.

SELLING OPPORTUNITY OFFERED

SALES REPRESENTATIVES wanted by well established manufacturer of concrete products. Excellent opportunity for aggressive men. Exceptional territories available. Excellent commission basis. Write P-6566, Engineering News-Record. All correspondence confidential.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,500—$35,000. The undersigned is a recognized organization of many years standing and reputation. The procedure, of highest ethical standards, is individualized to your personal requirements and designs ventures without initiative on your part. Your identity covered and present position protected. Send only name and address for details. R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N. Y.

POSITIONS WANTED

CONSTRUCTION SUPERINTENDENT. Broad experience in the industrial fields. Thoroughly familiar with estimating, layout and supervision of large construction jobs. Available on short notice. Box P-6572, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

GENERAL MANAGER-CHIEF ESTIMATOR. Age 45, married, desires connection with reliable executive capacity. Over 20 years' experience as contractor and general superintendent of construction, estimating, employed but desirous of change. Prefer location Chicago. Box P-6573, Engineering News-Record.

(Continued on the opposite page)

WANTED

PROJECT ENGINEERS
FIELD ENGINEERS

and inspection staff by large, long-established engineering organization for long-term water development program in Texas and Oklahoma areas. Supervisory and inspection staff must be experienced on dams, powerhouses, water supply, and irrigation. Vacancies include resident engineers, layout engineers, concrete technicians, field accountants, surveyors, and inspectors. Resident engineers must be college graduates qualified by ample experience to take complete charge of engineering on large contract projects under Chief Engineer. Please submit completely detailed personal, education, and experience record and salary requirements with first letter. All replies strictly confidential.

P-6413, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

PUMP DESIGNER

Centrifugal, Axial Flow and Deep Well Turbine Pump Manufacturer has position available for experienced pump designer with thorough knowledge of hydraulics. Mid-western location. Submit full particulars first reply, please. Replies will be held in strict confidence.

P-6681, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

MECHANICAL ENGINEER

Manufacturer of Sewage and Water Treatment Equipment requires the services of an experienced equipment designer with practical and educational background. Mid-western location. Please submit full particulars in your reply which will be held in confidence.

P-6685, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

GRAVEL PLANT SUPERINTENDENT

Wanted for operating and managing portable and permanent plants in Indiana and Michigan. State experience, references and salary.

P-6206, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED: BRANCH OFFICE MANAGER

Nationally known structural steel and plate fabricator seeks experienced contract manager with proven sales ability to take charge branch office large Midwestern city. Salary commensurate past earnings and present worth. Should have thorough knowledge estimating and design. Include photo, complete resume, references and salary requirements with reply.

P-6622, E.N.R., 330 W. 42nd St., N.Y. 36, N.Y.

WANTED

2 Structural detailer–checkers

Permanent jobs for good men with experience in all types of bridge and building work.

Apply by letter, giving resume of experience, also salary desired.

PAXTON & VIERLING IRON WORKS
P.O. BOX 1085 OMAHA, NEB.

FENCE AGENCY

AVAILABLE

National Chain Link Fence Manufacturer has agency opening. Experienced fence man preferred.

RW-6695, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

WRECKING SUPERINTENDENT

An opportunity exists for thoroughly qualified man to become associated with the nation's foremost demolition contractors. The man selected must have extensive experience in wrecking operations or must have been employed as construction superintendent. This is a responsible position and only man of top flight calibre will be considered. Past record must include experience in difficult work and in supervising demolition or construction. Applicant must be free to travel as our large scale operations cover the country. Those considered qualified will be paid travel expenses for interview to and from our offices. State fully your experience, age, education, and salary expected. Enclose snapshot if possible. Address

P-6626, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

ESTIMATOR

Wanted by established Pittsburgh firm of commercial and industrial contractors. Must have had experience with contractors engaged in similar work. State salary, experience and when available. Splendid opportunity for advancement.

P-6598, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

WANTED

STRUCTURAL STEEL DESIGNER

for leading Midwest fabricator

P-6605, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

ENGINEER, LICENSED

in New York State

Also Sales Engineer

Experienced in bridge construction and alterations. Permanent position for right man. Reply stating experience to

P-6596, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

Don't forget the

BOX NUMBER

When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It is our only means of identifying the advertisement to which you are replying.

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Thirty-ninth Year

OUR COURSES HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations

- Complete Structural Engineering Course.
- Public Works Structures.
- Architectural Engineering.
- Special Course (State Board Exams).
- Reinforced Concrete Engineering.
- Structural Steel Designing.

Monthly payments permissible. Information sent without obligation. WRITE TODAY

WILSON ENGINEERING CORPORATION

College House Offices • Harvard Square • Cambridge, Mass., U. S. A.

STRUCTURAL ENGINEER, C.E., P.E.

Desires responsible position design or supervision. 30 years diversified structural design experience, including supervision of design industrial and power plants, public buildings, R.R. shops. New York City preferred.

PW-6701, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

CONSTRUCTION SUPERINTENDENT

Age 37, graduate civil engineer. Eighteen years foreign service Africa, Indies, South America, some domestic, speaks many languages. Heavy construction specialist dams, hydro power plants. Can offer sound, money saving field supervision as well as qualified management ability.

PW-6702, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

POSITIONS WANTED

(Continued from the opposite page)

(Continued on the following page)

WASHINGTON SALES

CONSTRUCTION EQUIPMENT MAN with over 20 years of selling and administrative experience, including governmental and foreign contacts, desires connection with Manufacturer who is interested in full and live representation in Washington, D. C. Can furnish highest references.

P-6698, Engineering News-Record, 330 W. 42nd St., New York 36, N.Y.

LEARN TO ESTIMATE

Today more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

The **Tamblyn System of Estimating** will make a real estimator out of you in a few weeks of your spare time. We are so sure that you will want to learn it, that we will send you our complete home study course for ten days examination absolutely free. If you don't think it is the finest thing you ever saw, just return it and it won't cost you a cent. If you like it and want it, send us $8.75 when 10 days are up and $7.50 per month until $38.75 is paid.

This estimating system is based on forty years of actual construction experience. It has been sold all over the world for more than twenty years. Thousands of estimators and contractors swear by it. Our offer isn't hot air and big talk. We don't give you a diploma or a lapel button, but we do teach you down to earth estimating which will bring you profitable business.

Just send your name and address today, and we will mail you the complete course at once for your approval.

TAMBLYN SYSTEM

1115 So. Pearl St., E-412
Denver, Colo.

ESTIMATING SERVICE

Any Trade and Type of Project

QUANTITY ANALYSES & APPRAISALS

MATERIAL & LABOR PURCHASE REQUISITIONS

Literature and Sample on request

CONSTRUCTION SURVEY COOP
101 Park Ave., New York 17, N. Y.
MUrray Hill 5-7317 Founded 1922

(Continued from preceding page)

PART TIME WORK WANTED

LAYOUT DESIGN. Estimates. Sewer—Plants. Industrial—Building—Bridges—Industrial structures. Timber, steel, concrete, licensed P.E. PTWW-6196, Engineering News-Record.

ENGINEER SKILLED street designer. Know construction methods, costs, and contracting practices. Registered 4 states. Let's discuss your needs. Box 865, Philadelphia 5, Pa.

BUSINESS OPPORTUNITIES

For Sale

Portable Ready Mixed Concrete Plant, in excellent condition, located in South Central United States. Six truck mixers mounted on late model trucks. No competition in City or County. 100-cubic Engineering News-Record.

For Sale. Large gravel

pit located on Route 11A, Oswego, New York, near St. Lawrence Seaway. Crusher, vibrating screens, two late model shovels, complete washing available. Four sets complete subsidiary plants with storage bins, office, two years worn. George Cooke, Evans Mills, N. Y.

PATENT ATTORNEY

Patent Practice

before U. S. Patent Office. Validity and infringement investigations and opinions. Books free. Prompt attention. Conscientious, experienced service upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 4-H, 815-15th Street, N. W., Washington 5, D. C.

WANTED

Grubbing and Clearing That Can Be Done With D 8 Bulldozers.

Write

CARL ERICKSON
PINCONNING, MICHIGAN

SUBMERGED PIPE LINE CONSTRUCTION

BOYCE COMPANY

Phone 3-2530 Clearwater, Fla.

For Rent

SPEEDCRANES

LATE MODELS

Manitowoc Diesel Powered Speedcranes for rent. 25, 40 and 50 ton capacities with booms 100' or more, 20' and 30' jibs. Special price on long rentals.

FORSYTHE EQUIPMENT CO., INC.
37-11 Vernon Blvd. Long Island City, New York
Tel. STillwell 4-1030

FOR RENT

Modern Caterpillar Mounted CRANE, CLAMSHELL & DRAGLINES

40 to 60 ton Capacity

CLEMENS CONSTRUCTION COMPANY
P. O. Box 266 West New York, N. J.
PEnna. 6-0655

RENT

KOEHRING 604

80 ft. boom — 20 ft. jib

Triangle Equip. Contractors Inc.
1520 E. 31 St., Brooklyn 34, N. Y.

D-7-

Caterpillar Angledozer

Front cable control Cat. Blade —150 hrs total. Cannot be told from new. Big saving, must sell. Also low-boy 20 ton trailer with dolly.

TOM FISHER
JAVA CENTER, N. Y.

INSLEY TRUCK CRANE

2 cy capacity, 28' boom, on Mott Haven chassis modern design, special price, rebuilt

$4,175.00 free New York

BENDIX MACHINERY CO., INC.
101 Broadway, New York 13 Tel: Canal 6-5693

FOR SALE

Northwest Crane (Model 22) with 37' boom and extra shovel attachment. Wisconsin Gas Engine recently overhauled. Machine in very good condition and may be seen working any day by appointment.

A REAL BARGAIN

WALTON EQUIPMENT COMPANY, INC.
39 Cortlandt St. New York 7, N. Y.

WANTED

WANTED—*At Once*

30-Cubic Yard and 50-Cubic Yard

DUMP CARS

W-6009, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WE BUY OR SELL

All Types of

TRENCHING MACHINES

AIR COMPRESSOR RENTAL CO.
19615 NOTTINGHAM RD. CLEVELAND
Kenmore 1-8000

WANTED

HYSTER WINCHES

Towing or Worm Drive

Models D8N—D7N—D6N and D4N

JOHN FABICK TRACTOR CO.
3100 Gravois St. Louis 18, Mo.
Phone: Laclede 8900; L.D.—5

WANTED

Byers 1¼ cu. yd.

Shovel Undercarriage or Frame

or complete machine. Will pay good price.

BENJ. C. WARNICK
Freehold, New Jersey

Will pay spot cash for sand and gravel plant in good shape. State location, Capacity, and bottom price.

W-6025, Engineering News-Record
330 W. Madison St., Chicago 6, Ill.

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This index is published as a convenience to the readers. Every care is taken to make it accurate, but Searchlight Section assumes no responsibility for errors or omissions.

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L.B.SMITH INC.

OFFERS

SHOVELS—CRANES

Lorain 79 diesel powered 1½ yd shovel, Caterpillar D13000 engine.
Lorain 77 diesel powered 1½ yd shovel and crane, Caterpillar D13000 engine.
Marion 1 yd diesel powered heavy duty truck crane on heavily reinforced Mack.
P&H Model 100 ¾ yd. shovel.
Bucyrus Erie 10B Shovel Hoe, Trailer.
Lorain 37 Shovel Hoe.

SHOVEL & CRANE ATTACHMENTS

Chain crowd L41 shovel attachment.
P&H 203 shovel attachment.
Chain crowd Lorain 30A shovel attachment.
Lorain 40 Hi-Lift shovel attachment.
Bucyrus Erie 30B tunnel front attachment.
Koehring 301 dragline fairlead.

Backhoe Buckets & Attachments

¾ yd Lorain, 40, LBS ☐6105, 44" cutting width, teeth, sheave.
27" outside width drop bottom type LBS ☐1033, good condition.
26" outside width solid bottom type LBS ☐4377, good condition.
¾ yd Amsco 40" cutting width, LBS ☐8101.
Lorain 30 hoe attachment.

NEW TAGLINES

McCaffrey Model 648 for 1¼ to 2 yd crane.
McCaffrey Model 636 for ¾ yd to 1 yd crane.

SHOVEL DIPPERS

Lorain 41, ¾ yd, LBS ☐7413, new condition.
New Lima 1 yd, Amsco, LBS ☐2295.
Bucyrus Erie 1¾ yd gas-air, LBS ☐3782, fair.
Lorain 75 manganese 1¾ yd, LBS ☐7233, teeth and bail.
Lorain 75B, 1¾ yd extended lip, 1¾ yd LBS ☐2260.
Pettibone Mulliken 2 yd Lorain 82 or 820, manganese, LBS ☐5361.
Pettibone Mulliken 2 yd for 3500 Manitowac LBS ☐5763.

CLAM—DRAG—SCRAPER BUCKETS

AIR COMPRESSORS

Worthington, two-stage, water-cooled, vertical 250☐ 60 CFM, new condition.
Ingersoll-Rand 105 cubic foot, Waukesha gasoline power, on two rubber tires.
Gardner-Denver 105 cubic foot with air receiver, hose reel, driven by power take-off and mounted on 1941 Ford.
Gardner-Denver air-cooled 105 cubic foot with air receiver, V-belt drive from power take-off and mounted on 1942 Ford chassis with Wood two-yard dump body.
LeRoi 2-stage 105 cubic foot air-cooled, skid mounted, built-in tool boxes, hose reels and hose.
Gardner-Denver two-stage 160 cubic foot skid mounted.
Schramm 210 cubic foot with International UD14 diesel.
Worthington 210 cubic foot, two-stage, air-cooled, on steel wheels with Hercules diesel.
Chicago Pneumatic 210 cubic foot, two-stage, air-cooled, Caterpillar diesel on four rubber-tired wheels.
Gardner-Denver 315 cubic foot two-stage, skid mounted, Murphy four-cylinder diesel.
Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven 50 HP slip-ring motor.
New Gardner-Denver 500 cubic foot two-stage water-cooled, D13000 Caterpillar diesel on 4 pneumatics. Used 2 months.

QUARRY EQUIPMENT & BINS

Cedarapids BBB 1036 Scalper.
18 x 36 Farrell deep jaw crusher.
10 x 36 Cedarapids, practically new.
10 x 7 Allis Chal. Blake type jaw crusher.
Cedarapids No. 1 K Kut.
60 ton 2 compartment storage bin with clam shell gates.
New 16 x 16 double clamshell gates.
20" x 6'6" Belt Type Magnetic Separator.
Conveyors 18" - 24" - 30" - 36".

TRUCKS—TRAILERS

1½ ton Ford & Chevrolet.
2½ ton GMC. New and rebuilt.
Sterling COE Model 255GCS tandem drive tractor, 9.00x24 tires, 200 HP Cummins supercharged diesel, complete with 40 ton Rogers low bed equipment trailer, 16 - 7.50x20 tires, airbrakes, outriggers, excellent condition.
2,000 gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.
6x6 7½ ton Reo.

GASOLINE AND DIESEL ENGINES

New IXD Hercules Gasoline.
Buda, Hercules, Hill diesels, rebuilt.
New and rebuilt Murphy diesels.
GM 6 and 12 cylinder diesels, practically new.

CONCRETE ROAD BUILDING & MISCELLANEOUS CONCRETE HANDLING EQUIPMENT

Pavers & Mixers

27E Koehring Paver.
Jaeger 3 yd h.d. discharge truck mixer.

Concrete Finishers

Jaeger type "L" double screed, 10½'-12½', rebuilt.
Heltzel 10'-12' finisher, rebuilt.
Blow-Knox gas-electric 10½'-12½', rebuilt.
2 Koehring 10'-12', rebuilt.

Concrete Spreaders

Blow-Knox type SA 10-15' spreader. New condition.

Concrete Road Forms

830 - Truscon 7'x8' forms, with stakes.
1380 - Heltzel 7'x8' forms, with stakes.
1300 - Blow-Knox 8'x8' forms, with stakes.
4550 - Heltzel 9'x8' forms, with stakes.
1430 - Heltzel 10'x8' forms, with stakes.
1010 - Blow-Knox 10'x8' forms, with stakes.

Fine Grade Machines

Flynn subgrader, 10'-12', rebuilt.
B.B. Fine Grader for 21' width, rebuilt.

Form Graders—2 of each

Cleveland formgrader, new condition.
Curr formgrader, new 1944, rebuilt.

ROLLERS

Austin-Western 5-8 ton tandem.
Apsco trench roller.
Hercules 9-11 ton, three-wheel.
Buffalo-Springfield 10 ton, three-wheel.

GENERATORS & LIGHT PLANTS

1½ KW to 125 KW, alternating and direct current, gasoline and diesel powered.

GRADERS

New Warco D76 tandem driven grader, 12' blade, V-type scarifier, 13.00x24 tires all around, 24,500 lbs., International UD14A diesel engine.

TRACTORS

FD Cletrac crawler tractor, Buckeye bulldozer & double drum power control unit, DHXB Hercules diesel engine. Rebuilt, immediate delivery.
International TD 9 with Bucyrus Erie angle dozer.
Minn Moline UTI wheel type, gas powered with Lull front end shoveloader.

Phone HARRISBURG, PA. 7-3431

LASTING • BONAFIDE • SERVICE
L.B. SMITH, INC.

L.B.SMITH INC. CAMP HILL, PA. SUBURB OF HARRISBURG

WE OWN THE EQUIPMENT WE ADVERTISE

DIESEL POWER

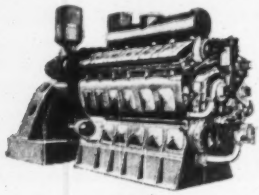
FOR

IMMEDIATE SHIPMENT

UNIT CAPACITIES—10 TO 1875 KVA

A.C.—50 AND 60 CYCLES

VARIOUS VOLTAGE



A PARTIAL LISTING OF OUR INVENTORY

KVA	Make	Model	HP	RPM	KVA	Make	Model	HP	RPM
1875	Fairbanks Morse	32H16	2600	600	375	Enterprise	DMD6	540	514
1430	Fairbanks Morse	38D8⅛	1980	720	350	Superior	KSA	500	514
1250	General Motors	16-278A	1600	720	312	General Motors	8-268A	450	1200
937.5	General Motors	12-567	1090	720	312	Ajax	DFA	454	327
625	Allen	6-12½(3SW)	740	600	125	General Motors	3-268A	190	1200
625	Baldwin	Vee	850	450	75	General Motors	6034	90	1200
400	Buckeye	80	480	600	62½	Int'l Harvester	UD6	76	1200

D.C. UNITS ALSO AVAILABLE

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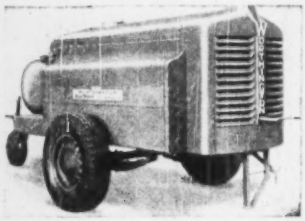

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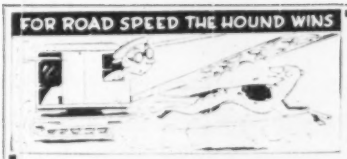

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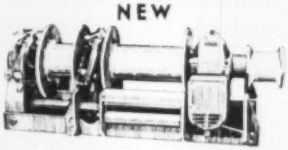

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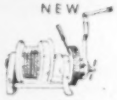

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ITEM	PCS	SIZE
1	175	4" x 3" x ... x 16-20'
2	90	1½" x 1½" x ... x 20'
3	26	1½" x 1½" x ... x 16-20'
4	30	1½" x 1½" x ... x 16-20'
5	44	2" x 2" x ... x 8'-5"-8'-6"
6	11	2" x 2" x ... x 16-20'
7	198	4" x 3" x ... x 60'

HOT ROLLED CHANNELS

8	20	7" x 4 1/2 x	20'
9	14	6" x 3 4/5 x	20'
10	5	6" x 8 2/5 x	60'
11	27	8" x 11 5/8 x	60'
12	25	10" x 15 3/8 x	60'
13	5	10" x 20# x	65'
14	32	12" x 20 7/8 x	60'

HOT ROLLED RODS

15	20	... RE. x 10-4"
16	22	¼" Rd. x 16'
17	10	... Rd. x 16'
18	18	... Rd. x 16'

HOT ROLLED REINFORCING BARS

19	85	... Rd. x 25'-30' *
20	8	... Rd. x 25'-30' *
21	16	... Rd. x 25'-30' *
22	17	... Sq. x 25'-30' *
23	18	... Sq. x 25'-30' *

* 10' shorts to 15'

GALVANIZED WIRE

24 20 ... ga. x Coils

For brevity refer to Item No.

"BE WEISS—BUY WEISS"

U. S. AIR CORPS TYPE
NEW, SAFER, SHOCK RESISTANT
SUN GLASSES
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SIGHTING LEVEL
COMP. WITH U. S. ARMY PLASTIC POUCH
SPECIAL LOW PRICE $1.85
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BE SAFE—BE SURE ON LAND OR SEA
Brand New U. S. Navy
POCKET COMPASS
DEPENDABLE ACCURATE
Has Many Features Not Found in Compasses Many Times This Price
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The Oldest Equipment House in Phila.

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Send your transits and levels for complete overhauling and reconditioning by experienced factory trained mechanics. Examination and estimates without cost. Your instrument should be sent express prepaid for a prompt repair estimate.

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June 8th Issue of
ENGINEERING NEWS-RECORD

FINAL CLOSING TIME
Display and Undisplayed Ads
Friday, May 19th
PROPOSALS
Friday, June 2nd

SALE NEW & REBUILT EQUIPMENT

1—D8 in 2U820 series, new.
2—D8's in 2U series w ddbru and 8A angledozers.
1—TD14 w Isaacson 8yd. angledozer & B-E ddbru.
1—Garwood Model 51C scraper, new.
3—Garwood Model 51S scrapers, excellent cond.
1—Huber 10-ton tandem diesel roller, used 200 hrs.
1—Lima Model 802 shovel-dragline combination.
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1—Lorain Model 40 dragline-backhoe combination.
1—P&H ½ yd. dragline-crane.
1—Lorain ½ yd. shovel.
1—Browning 10-on steel erecting crane, 35' boom.
1—Insley ½ yd. crane-dragline.
We solicit your inquiries for all kinds of used construction equipment. We have a large stock in our yard at Asheville and listings all over the U. S.

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From ½" to 5" Pitch
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Buda Diesel Engine. 36'9" boom
800 gal. auxiliary water tank

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2—New D-13000 Caterpillar Diesel Engines, 150 H.P. Complete with Clutches and Pulley-drives.
1—Schramm Diesel 315 cu. ft. 2 stage comp. 1947.
1—Ing-Rol Diesel 315 cu. ft. 2 stage comp. 1948.
1—15 ton Plymouth Loco. Std. gauge gas.
1—50 ton Porter Loco. 0-6-0 Std. gauge.

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SALE
MODEL 6 NORTHWEST

THE GRAYSTONE CORP.
2100 First National Bank Bldg.
Pittsburgh, Pa. Atlantic 1-5514

Buckeye trenchers, 120, 160, 205, 205-S2D.
Parsons trenchers, 250, 440, 21.
Euclid 45-ton rear dumps. Athey 12-yd. wagons.
Draglines, B-Erie 200W, Monighan 17, 21, 150W.
Shovels, Buckeye 108, 108B, 6A, 6, Marion 91, 950B.
Link-Belt K-15, 595, NW 80 & 60, Lima 1201.
Concrete batching plant, 615 bbl., bin, 1918.
Locomotives, 50 tons, diesel, gas, steam, 150.
Crushers, gyratory, jaw, rolls, mills, 24".
B-Erie shovel front att., 2-1 ½ yd.; 5-B-55B.
H. Y. SMITH CO., 828 N. B'way, Milw. 2, Wis.

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One used Barber Greene asphalt plant dust collector.
Contact
DICKERSON, INC.
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STEEL SHEET PILING

Bethlehem SP-4 section
First class redrivable

102 Pcs 42 to 39 ft
249 Pcs 37 to 34 ft
932 Pcs 33 to 30 ft
575 Pcs 29 to 26 ft
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Also Tee Pieces

Immediate shipment from southeast

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Location—Birmingham, Ala.

163 Pcs. SP6a 14 to 17 feet
60 Pcs. SP6A 11 to 14 feet
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21 SP6A Corners
62 SP7A Corners

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SALE OR RENT—MOTOR CRANE

Michigan TLDT20, 95' Boom, 15 Tib. Like New. Used on Steel Erection Work only. $13,500.00, FOB Abilene, Texas.

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Other lengths & sections at various locations
All sizes Vulcan & McKiernan Pile Hammers & Extractors for Rent and Sale. Shop Rebuilt. Regardless of location of your job, wire or write

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Model 304 WC 1 ½ Yd. Capacity

Equipped with 105 ft. boom and material handling bucket. Excellent condition. Priced for quick sale!

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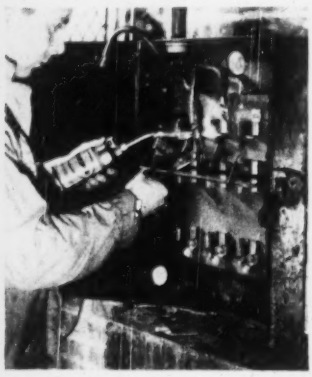
NEW PRODUCTS

Battery-Powered Lightweight Grease Gun Speeds Field Servicing

Electrically powered grease gun simplifies field lubrication of all types of construction equipment. Weighing 25 lb. loaded, the gun will handle 25 lb. of grease of any weight. A modified Ford starter motor develops up to 5 hp. in the pump. Hundreds of adjustment provides grease pressures from 500 to 12,000 psi at the nozzle. A metering hand nozzle can be adjusted to pass any size shot of lubricant. Or, standard hand nozzle can be used. Safety feature is the use of 6-volt current, eliminating possibility of electrocution or injury to the operator. Double check valve cleans itself of trash in the gun. The unit is 23 in. high and 27½ in. long.—The Brown Grease Gun Co., Fifty-first Rd., Charlotte, N. C.

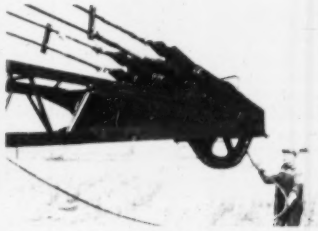


Hand Torch Uses New Fuel

Torch features disposable container and a new self-pressurizing self-vaporizing fuel. The new torches, which light instantly with a match, do away with all pumping, pumping and priming. The Propi-torch consist of a series of contemplated liquid petroleum appliances is available with two easily interchangeable flaming tips. The long tip has a long, broad flame for work where a great deal of heat is required quickly. The other tip has a long pin-point flame which is ideal for soldering and other work where heat must be concentrated in a small area. Fuel, contained under pressure, is changed. The fuel is non-toxic, non-poisonous, and is packaged in a container tested to withstand many times the pressure of the fuel, even at extremely high temperatures.—Pressure Products Corp., 140 N. Dearborn St., Chicago 2, Ill.

Earth-Fill Tamping Rammer

Self-contained and portable tamper produces high degree of compaction in restricted areas. Extremely high penetration of the Barco rammer insures specified compaction on lifts of 12 to 20 in. The tamper can be used on sand to granular soils and will tamp about 10 to 24 yd. of soil per hour. It operates on the rocket principle, jumping upwards from the thrust of the power cylinder against the foot and dropping by its own weight. Ignition is supplied by a magneto. Barco Mfg. Co., 1814 Winnemac Ave., Chicago 40, Ill.

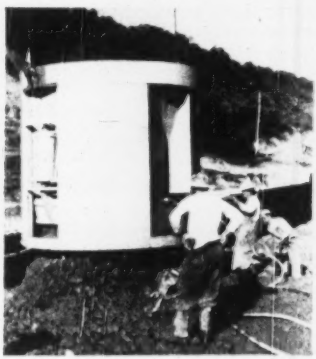


Longer-Life Cable Assemblies

Boom-support assembly effectively conducts effects of severe vibration on power shovels, draglines, and cranes. It involves a new thimble design embodying an interwoven eye and open-end pendant easily and quickly interchangeable on standard equipment. This design dampens vibration instead of concentrating it at one point, resulting in longer life for boom supports. These supports are adaptable to installations where fatigue failures occur adjacent to sockets. Essential dimensions—pin diameters, distance between centers, etc.—are the same as for standard open and closed sockets.—American Steel & Wire Co., Rockefeller Bldg., Cleveland, Ohio.

Hand-Sighting Level

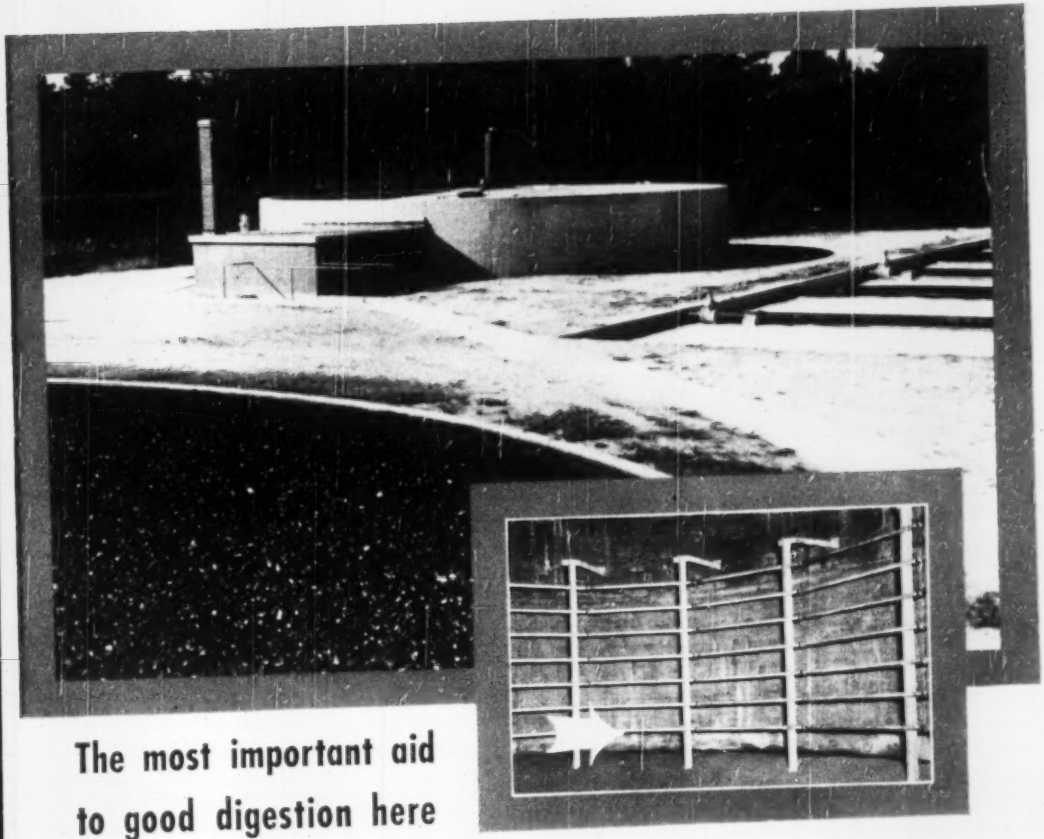
For accurate alignment when laying drains and foundations, contour grading, and similar leveling operations, a precision-built low-cost hand-sighting level is now available. Made of brass, the complete level measures 5 in. in length.—Binoscope Co., National Distributor, P. O. Box 9384, Philadelphia 39, Pa.



Low-Slump-Concrete Bucket

Circular bucket can load and discharge quickly all types of concrete.

Continued on page 122



The most important aid to good digestion here

→ BYERS WROUGHT IRON PIPE

Serving a community of 10,000, this new Orangeburg, S. C., sewage treatment plant is completely modern in all respects—including its answer to the corrosion problem. The digestor coils, which face extremely severe attack, as well as certain other connected services, are Byers Wrought Iron. The inset picture shows a typical digestor-coil installation. The plant was designed by Barber, Keels and Associates, and built under the supervision of City Engineer Alex T. Brown.

Whether your sewage treatment plant is large or small, successful, economical operation depends heavily on the proper selection of materials. The use of short-lived piping means early and costly repairs, and a heavy burden on the taxpayer. Byers Wrought Iron pipe has demonstrated its exceptional qualities in practically every corrosive service, and provides a sound means of getting maximum life from the installation, with minimum maintenance. A check of specifications of all varieties of modern plants will show how extensively engineers rely on wrought iron to combat corrosion.

The corrosion resistance of wrought iron comes from the composition and structure of the material. Tiny fibers of glass-like silicate slag, threaded through the body of high-purity iron, halt and "detour" corrosive attack, and so discourage pitting. The fibers also anchor the initial protective film, which shields the underlying metal.

If you are concerned with the design, construction or operation of a sewage treatment plant, you'll find some helpful information in our bulletin WROUGHT IRON FOR SEWAGE TREATMENT AND DISPOSAL INSTALLATIONS. A copy will be sent on request. We would like to remind you also that in any wrought iron pipe installation, the use of *wrought iron nipples* should always be specified. This will eliminate any risk of "weak-links" in your system.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, San Francisco. Export Division: New York, N. Y.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

BYERS
GENUINE WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

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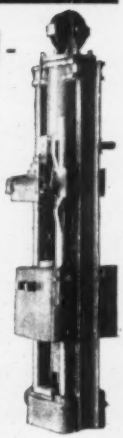
WARRINGTON-
VULCAN

SINGLE-ACTING STEAM

PILE
HAMMERS



Tough piles tame quickly when Warrington Vulcan goes to work. It's a powerful, rugged hammer, built for heavy duty through and through, for economical, trouble-free performance year after year on the most difficult pile driving projects.

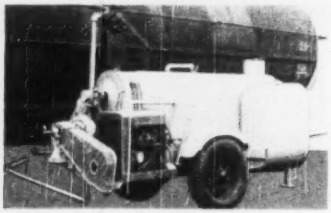
Its action is regular and continuous; its design is simple for easy operation, and it is built with a durability that gives you dependability on job after job.

The Single-Acting Warrington Vulcan operates at medium steam pressure, delivering a moderate frequency of low velocity blows from a relatively heavy ram to drive piles of any description.

Write today for complete details.

VULCAN IRON WORKS
Since 1852
331 North Bell Avenue
Chicago 12 ---Illinois

It was especially designed for handling low-slump concrete containing large aggregates and air-entraining agents. The Model CAC bucket has an air-operated clam gate that provides positive control and quick action in opening and closing. Part of load can be deposited, or it can be completely discharged in one operation. Rectangular openings prevent arching over discharge throat. Buckets are furnished in 2, 3, 4, and 5-yd sizes. The 5-yd model can be supplied as a 1- or 2-compartment bucket.—BLAW-KNOX CO., BLAWNOX, PA.



Heater for Asphalt Tanks

Light-duty heater for tanks or tank cars of asphalt is designed for those who do not ordinarily heat and apply more than 10,000 gal of asphalt per day. The Model 50 Rapid Fire heater is not equipped with steam generator for thawing cold asphalt. Equipment for thawing car or tank by circulating hot oil through steam coils is available as extra equipment.—W. F. GRACE MFG. CO., 6015 S. LAMAR ST., DALLAS, TEX.

Forged Manhole Steps

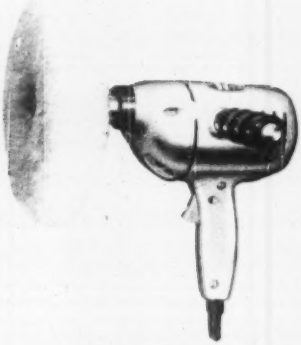
Forged aluminum manhole steps and ladder rungs are recommended for both interior and exterior use. Available in three sizes according to the projection required, they are adaptable to concrete, brick, or concrete block wall construction.—Alloy aluminum alloy 61S-T6 has been specified for high corrosion resistance and strength.—ALUMINUM CO. OF AMERICA, 801 GULF BLDG., PITTSBURGH 19, PA.

Wear-Resisting Plate

Heat-treated alloy-steel plate is recommended for repair of construction equipment where resistance to abrasion and impact is important. Typical uses for Bulldog Tufalov include truck-bed maintenance, baffle plates, crusher hammers and buckets.—ALLIED STEEL PRODUCTS, INC., 7855 BROADWAY, CLEVELAND 5, OHIO.

Wheel-Mounted Loader

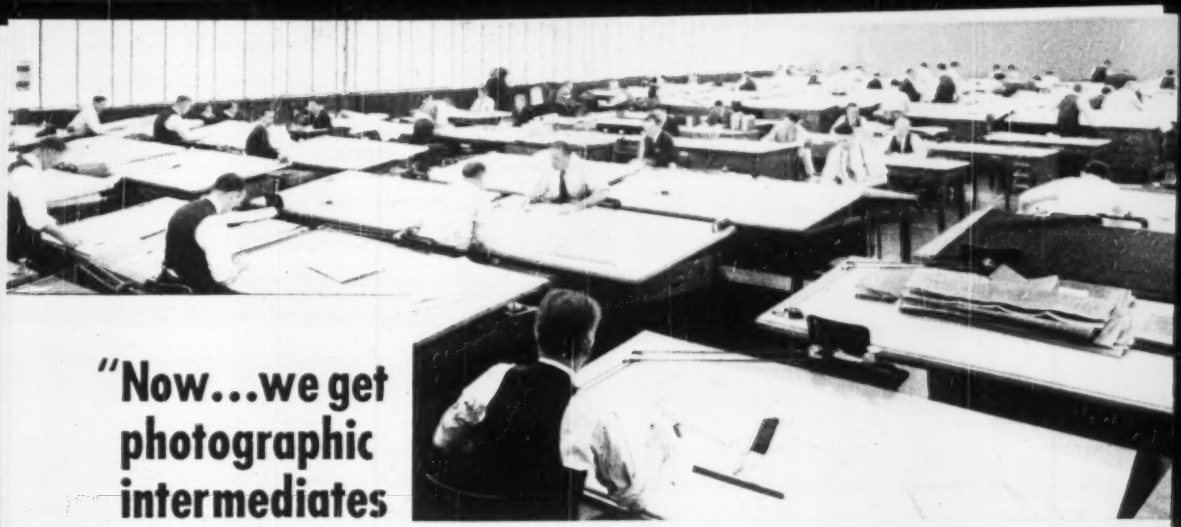
Safety for operator is principal feature of the Trojan Loadster. The reverse-curve bucket arms are designed to prevent the operator's arms, hands, or head from becoming entangled under any operating conditions. The Model LM-75 has a lifting capacity of 4,200 lb, and a maximum dumping clearance of 8 ft. Powered by a 40-hp gasoline engine it has a maximum forward speed of 15 mph. Available accessories include Drag-line, bulldozer, fork, crane hook, and V or one-way snow plow. Complete information can be obtained from CONTRACTORS MACHINERY CO., 1501 CLINTON ST., BUFFALO, N. Y.



Seven-Inch Junior Polisher

Designed for intermittent service in small shops and garages, the 7-in. Junior Polisher has a weight of 5 lb. It is a side handle type and with a reversible handle for right- or left-hand use. Side handle has a trigger switch.

(Continued on page 124)



"Now...we get photographic intermediates quickly, economically"

reports

THE HEALD MACHINE COMPANY

A section of the engineering department—The Heald Machine Company, Worcester, Mass.

Since 1947 the production of photographic intermediates has been easier, faster, more economical for The Heald Machine Co. *Thanks to Kodagraph Autopositive Paper.*

With this revolutionary, low-cost intermediate material, positive photographic copies of original drawings are produced *directly*—without a negative step.

Furthermore, Heald uses its direct-process machine for the exposure operation; standard photographic solutions for development. And there's this convenience, too: darkroom handling is a thing of the past! Both operations are performed under ordinary room light.

How "Autopositive" is used: A large percentage of the precision finishing machines manufactured by Heald are specially engineered to customer-specifications. And, frequently, Heald is requested to draw special units and fixtures on the customer's own drafting paper. These originals are reproduced on "Autopositive" (for Heald's record) and turned over to the customer when the job is completed.

Thus, when repair parts are requested or a duplicate order is entered, shop prints can be made promptly from the Autopositives. These new intermediates have dense photographic black lines on an evenly translucent base . . . will not smudge or smear in print production . . . turn out sharp, clean prints at uniform, practical machine speeds.

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A new illustrated booklet, "Modern Document and Drawing Reproduction," gives all the facts on this revolutionary photographic intermediate material. *It's free. Just mail the coupon.*

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Please mail a free copy of "Modern Document and Drawing Reproduction," your new booklet on Kodagraph Autopositive Paper.

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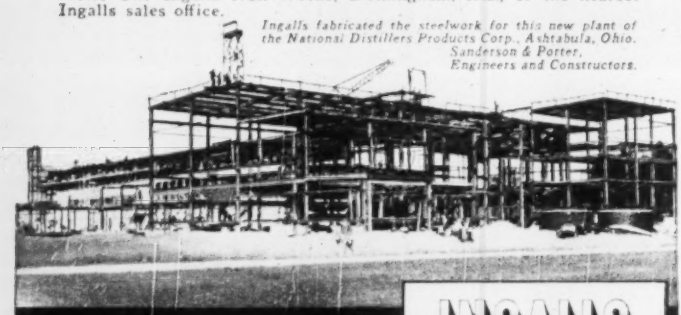
For half a century, Ingalls has furnished fabricated steel for American business to grow on. The highest names on the industrial roster specify INGALLS STEEL, again and again, because they get completely satisfactory service — work fabricated to specifications, delivered to schedules, at lowest cost.

When you need fabricated steel, think of Ingalls. Complete engineering staff, erection service if desired; five fully equipped plants. Write The Ingalls Iron Works, Birmingham, Ala., or the nearest Ingalls sales office.

Ingalls fabricated the steelwork for this new plant of the National Distillers Products Corp., Ashtabula, Ohio. Sanderson & Porter, Engineers and Constructors.



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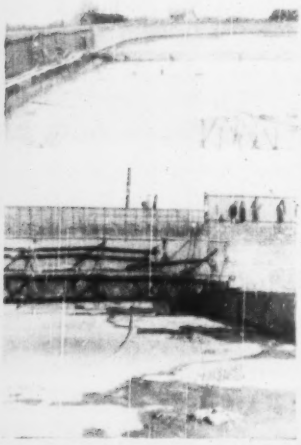
Sales offices in New York, Chicago, Pittsburgh, New Orleans

"GUNITE" USED BY CEMENT GUN CO. TO REPAIR AND ENLARGE RESERVOIR



In 1947 we "GUNITED" the West End Reservoir at Hagerstown, Maryland. The pictures clearly show important stages in our work to give it greater capacity and to stop excessive leakage. After existing cracks in the concrete floor were sealed, "GUNITE" was applied to waterproof and reinforce the stone masonry and to add 30 inches to the height of the walls.

Many instances of repair, remodeling and new construction with "GUNITE" are described and pictured in Bulletin A2400. A request on your letterhead will bring your free copy by return mail.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

MANUFACTURERS OF THE CEMENT GUN

with switch-locking pin for continuous operation. Available in 115, 220, 125, and 240-v models.—The Van Dorn Electric Tool Co., Towson 4, Md.

One-Yard Excavator

Power shovel-crane, rated in the 1-yd class, features Twin-Disc hydraulic coupling as standard equipment. A plate clutch permits stopping machinery without stopping the engine. Diesel engine is standard, with a gasoline engine available as optional equipment. The TL-50 can be used as a shovel, crane, clamshell, dragline, or hoe. Four crawler mountings are available.—The Thew Shovel Co., Lorain, Ohio.

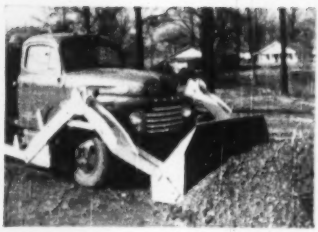
Four-Ton-Capacity Hoists

Wright Safeway hand hoists are available in capacities from ½ to 4 tons. Features include high degree of safety, portability, light weight, and close headroom. Construction features include modern gear drive, Weston-type brake, steel load chain and self-lubrication.—American Chain & Cable Co., Inc., Wright Hoist Division, York, Pa.

Portable Truck Scale

Removal of six nuts which hold side irons in place permit transporting the Thurman truck scale on flat bed truck. It is quickly re-assembled on the job. Scales can be furnished with full capacity weighing or weighing and having not and tare bars. They have extra wide heavy steel bases at either end which support the scales, eliminating the need for footings and foundations. The Thurman scales are made in 15, 20, 25, and 30-ton capacities.

ties, and in 18, 22, and 30-ft platform lengths.—Thurman Machine Co., Scale Division, 156 N. 55th St., Columbus, Ohio.



Truck-Mounted Loader

One-man operated truck-mounted loader has a volume capacity of 1 yd, a weight capacity of 1,500 lb. Operated from truck cab, the Holmes Oxen loader can be used for light digging, grading, scooping up, loading, hauling, and unloading. It has a double-jointed design to give each implement the flexibility of elbow action. Power is provided by four independently operated hydraulic cylinders. When not in use, loader does not interfere with regular use of the truck.—Ernest Holmes Co., 2505 E. 45th St., Chattanooga, Tenn.

New Product Briefs

FM 2-way pack radio incorporates a 10-tube receiver and an 8-tube transmitter into a compact 19-lb radio station that can be hand or back carried, or used as a semi-fixed installation. The Motorola set is designed for operation in either the 25-50 mc band or the 152-174 mc band.

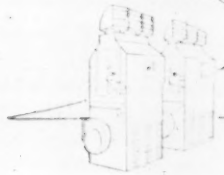
Multi-purpose grease permits use of one grease and one grease gun for complete lubrication of construction equipment. Lubriplate is produced by Sinclair.

Carboloy-tipped saw blades permit longer use between sharpening. These Skilsaw blades are available in 7 in. dia with 18 teeth and 9 in. dia with 20 teeth.

Two-wheeled pick-up cart can be used for hauling and dumping concrete, for general light-duty carrying tasks, and similar uses. The Gardencer is balanced for easy handling. Front tilts to ground for loading or unloading.—Miller Inland Steel Products Co., Milwaukee 1, Wis.

Self-propelled compressors are announced in two new models. The Schramm Pneumatic is mounted on 66-in. gauge and 105-in. tires.

THEY* "BOOTED OUT" SALAMANDERS



THEY INSTALLED DRAVO HEATERS

THEY SAVED

$4,372.00 PER YEAR

*Rosedale Foundry and Machine Company, Pittsburgh, Pa.

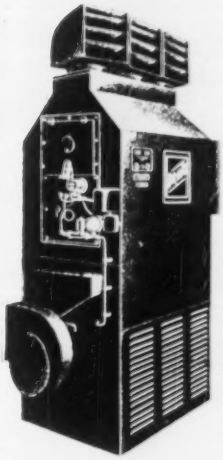
Like many other metalworking plants, Rosedale, producers of Meehanite Metal castings, depended for years on salamanders for heating. Everyone *assumed* that any more modern method would cost too much, and probably couldn't heat the high-roofed, metal structure much better anyway.

But no one was happy about the situation. Coke and labor were big cost items. Production was lost while men "thawed out". Air was smoky and sulphurous.

So Rosedale investigated, and found (1) that Dravo *Counterflo* Heaters could do the job for LESS cost than salamanders. (2) that Dravo was already heating many similar structures with complete satisfaction, and (3) that Dravo Heaters would help clear up the polluted atmosphere.

Result: four Dravo *Counterflo* Heaters were installed, eliminating 39 salamanders. Yearly cost reduction is $4372. Even with 25% annual amortization, this company is currently saving $500 a year. After four years the investment will be completely written off, and the entire saving will be velvet. The indirect savings: improved production, greater employee comfort, elimination of coke fumes, and saving in floor space—are extra dividends. Everybody's happy about the heating now.

No one can afford, today, to put up with old-fashioned, inadequate heating equipment any more than to use old-fashioned production machines. Let us review your heating problems, and provide you with some specific examples of the savings Dravo *Counterflo* Heaters are making for others—and that they can make for you. Consult your classified telephone directory for the name of the local representative—or write us direct.



DRAVO
CORPORATION
DRAVO BUILDING, PITTSBURGH 22, PA.

Sales Representatives in Principal Cities

Mfd. and Sold in Canada by Marine Industries, Ltd., Sorel, Quebec

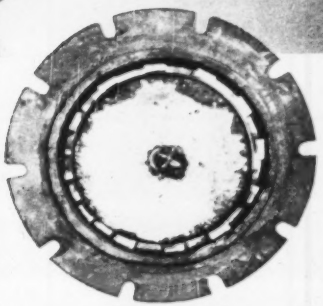
It's easy to tap!

LOCK JOINT
CONCRETE PRESSURE PIPE

Lock Joint Pressure Pipe of any design may be tapped easily and economically for the purpose of establishing either large connections or small service outlets. With the aid of a few simple instructions, any experienced service crew can apply the modern tapping technique which permits the making of connections in concrete pressure pipe while the line continues to operate under pressure.

Although for many years, taps have been made successfully in concrete pressure pipe, today's efficient equipment and modern methods now make it possible to tap Lock Joint Concrete Pressure Pipe with even greater economy of time, money and effort, and without sacrificing strength.

At your request we would be glad to send you our booklet outlining the simple steps required in making a pressure tap in Lock Joint Concrete Pressure Pipe.



LARGE PHOTO: Tapping a 16" outlet in a 36" pipe at Wayne County, Michigan.

SMALL PHOTO: The pilot drill of the tapping machine withdraws the concrete core, making a clean cut, and leaving no obstruction within the pipeline.

Lock Joint Pipe Company for over forty years has specialized exclusively in the manufacture of reinforced concrete pipe for water supply and transmission mains as well as for sewers, culverts and subaqueous installations.

LOCK JOINT PIPE COMPANY

P.O. Box 269, East Orange, N. J.

PRESSURE PIPE PLANTS: Wharton, N. J., Eagner, Ken., Detroit, Mich.

BRANCH OFFICES: Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. Kansas City, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. Oklahoma City, Okla. • Tulsa, Okla.

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

Manufacturers' Publications

Chain-Saw Handbook — Maintenance, specific uses, specifications, and capacities of a complete line of chain saws are illustrated and described in handbook 48-pp. designed as primer, illustrated guide, and easy manual. The manual covers starting, speeding, and stopping the engine; proper oil and gasoline mixtures; how to notch and fell different species of trees; and other applications for this type of saw. A special section is devoted to service information and preventive maintenance. — HENRY DISSTON & SONS, INC., Dept. 229, Philadelphia 35, Pa.

Hercules Bulletins — Hercules Steel Products Corp. announces the publication of eight bulletins. These bulletins cover the Hercules cement spreader, materials handling power chute, medium-duty hoists and dump bodies, the JDX low mount hydraulic hoist, hoists, medium-duty, and special bodies, split-shaft power take-off, tie and tool pick dump body, and fertilizer and lime spreader. — HERCULES STEEL PRODUCTS CORP., Galion, Ohio.

Sectionalized Conveyor — Four-page bulletin is an illustrated description of the Hewitt-Robins Sectional Conveyor. Bulletin 152 contains a complete description of the load carrying, intermediate frame sections, idlers, protective decking, transition sections, boot supports, boot covers, feeding hoppers, and tail sections. Also listed are steering sections. — ROBINS CONVEYORS DIVISION, HEWITT-ROBINS, INC., Passaic, N. J.

Three-Way Bond Copper Flashing — Complete information on Majestic Triple Bond Three-Way copper flashing is contained in a 4-page folder. The bulletin includes drawings of typical installations, photographs of the metal and of buildings in which it is used, and specifications for the Majestic installation. — C. G. HUSSEY & CO., 2850 Second Ave., Pittsburgh 19, Pa.

Architectural Aluminum Shapes — Fifty-six pages cover an enlarged line of architectural aluminum products. Items listed include extruded sections, embossed sheet, perforated sheet, plain sheet and plate, tubing and pipe, and other products for architectural use. Particular attention is given to a pocket-type folder holding base sheets. Full

(Continued on page 130)

ONE Grease for ALL

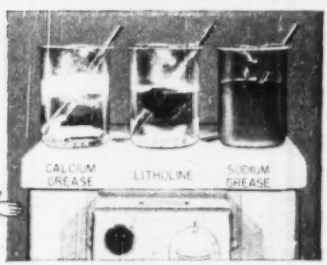
"Yes—One Grease, One Gun and A Better Job too!"

Here is a versatile grease that can be used with absolute confidence wherever lubrication is needed—chassis, wheel bearings, water pumps, universal joints, etc., in winter or summer—under *all* kinds of operating conditions.

These 4 Severe tests prove is better than any single grease!

SCENE: Sinclair's Research Laboratories, Harvey, Ill.

CAST: Two commonly-used greases of highest quality; a calcium soap chassis lubricant and a sodium soap wheel bearing grease; and Sinclair's Litholine.



WATER-RESISTANCE TEST

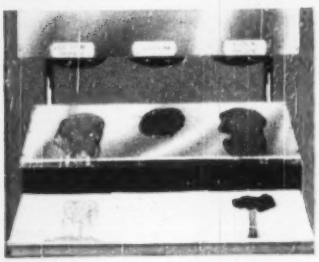
Samples of each grease are heated in beakers of water. Near boiling, the sodium grease disintegrates into soapy water and oil. Shortly after boiling the calcium grease shows foamy emulsion as grease absorbs excess water. Litholine remains unaffected, proves its superiority in combating wet conditions.

SINCLAIR REFINING

Lubrication Jobs!

LOOK WHAT ONE-GREASE—ONE-GUN LUBRICATION MEANS TO YOU...

1. Superior protective lubrication
2. No danger of misapplication
3. Less chance for contamination
4. Reduced time-out for lubrication and maintenance
5. Fewer servicing man-hours
6. Less wastage
7. Fewer dispensing units
8. Smaller grease inventories
9. Simplified purchasing and distribution
10. A finer grease at every lubrication point

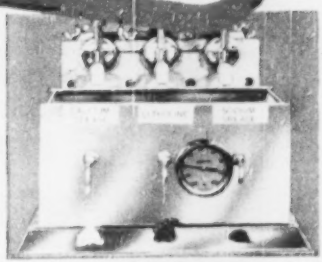


HEAT-RESISTANCE TEST!

The samples are heated on a plate. At 190°F., the calcium grease disintegrates. At 340-350°F., the sodium soap structure collapses and releases the oil. Bearing failures would follow. At 380°F., Litholine shows no effects, proves superior for high temperature lubrication jobs.

MECHANICAL STABILITY TEST!

Worked (kneaded) samples are placed beside samples of unworked grease. Steel balls are dropped. Distance ball sinks in worked samples shows increase in softness—loss of stability. The calcium grease showed greatest increase in penetration; the sodium grease next. Litholine showed no difference whatever . . . proving its superior mechanical stability in service.



LOW-TEMPERATURE PUMPABILITY TEST!

Lever-type grease guns are filled with chassis greases and cooled. At 20° F., it is impossible to pump the sodium grease. At 0° F., it is impossible to pump the calcium grease. But Litholine still pumps in good volume! Yet Litholine is a heavier (harder) grease. Thus, Litholine has the body for summer service yet is pumpable in severely low temperatures.

COMPANY

For lubrication counsel, or more information on Litholine, see your nearest Supplier of Sinclair Products, or write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, New York.

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size cross-section drawings are shown with nothing printed on back of sheet, permitting draftsmen to trace the sections directly. The portfolio is completely indexed for handy reference. Write on company letterhead.—REYNOLDS METALS CO., 2500 S. 3RD ST., LOUISVILLE, KY.

Diesel Quiz—Pamphlet describes features, characteristics, and application of General Motors diesel engines. Designed in questionnaire form, the quiz provides simple, easy-to-understand answers to 17 basic questions about design and operation of diesels.—DETROIT DIESEL ENGINE DIVISION, GENERAL MOTORS CORP., 13400 W. OUTER DRIVE, DETROIT 28, MICH.

Facts for Draftsmen—Illustrated booklet contains helpful hints for draftsmen. Tips on paper and cloth, standardization of sizes, color, pencil and ink techniques, and the use of reverse carbon paper are covered. The booklet is part of a long-range educational program instituted by the commercial blueprint industry.—INTERNATIONAL ASSN. OF BLUE PRINT & ALLIED INDUSTRIES, 3006 S. WABASH AVE., CHICAGO 5, ILL.

Portable Compressor—Bulletin describing of the Model 60 WBD (60 cfm capacity) Super Chief compressor lists 10 features claimed. Photos show the Super Chief in action on several types of work including road building, public utility, and sand blasting. Compressor specifications are listed in detail.—DAVEY COMPRESSOR CO., KENT, OHIO.

Arrest and Prevention of Rust—Six-page engineering data sheet discusses the arrest and prevention of rust. The report clearly illustrates and describes causes, effects, and proper means for control of rust. Designed for field and maintenance men in the light and power industry, the information is of vital interest to anyone concerned with the problem of rust.—INTERNATIONAL RUSTPROOF CORP., 12507 PLOVER AVE., CLEVELAND, OHIO.

Precision-Built Cement Floors—Illustrated catalog (8 pp.) describes Kalman process for building monolithic hardness and density over complete floor areas. It features a description of the laying of one of these granolithic cement floors in a typical plant showing in detail the under-slab preparations, preparation of proper aggregate Kalman topping mix, absorption control, compacting, surfacing, troweling and curing. Service characteristics are fully outlined.—KALMAN FLOOR CO., 100 E. 42ND ST., NEW YORK 17, N. Y.

Work-ability proved with every yard moved

★ SPECIFY

PREFORMED YELLOW STRAND

SPECIAL SCRAPER ROPE

Long Lay, with Independent Wire Rope Core
1/2" or 9/16"

On your scraper the *cable* has a lot to say about *control*—control of the cut, yardage per load, round trips per hour, cost per job. To follow through on these opportunities for fast, economical production, see that *Preformed* Yellow Strand Special Scraper Rope goes aboard each earthmoving machine.

The operator gets *accurate* response with this smooth-running cable. It's limbered to take short bends and sudden shocks . . . to spool evenly . . . to handle safely when the line is shifted. Special lubrication equips the rope for rugged wear and exposure.

Your B & B distributor will gladly work with you to standardize on *Preformed* Yellow Strand Special Scraper Rope and to maintain a balanced supply of spares. See him, too, for long-lived hoist and drag lines.

Broderick & Bascom Rope Co., St. Louis 15, Mo.

Branches: New York, Chicago, Houston, Los Angeles, San Francisco, Portland, Seattle. Factories: St. Louis, Peoria, Houston, Seattle

BRODERICK & BASCOM

Yellow Strand

PREFORMED WIRE ROPE

How to develop water supplies

A few wide-awake cities are pushing ahead in the neck-and-neck race between skyrocketing consumption and development of water supplies necessary for economic progress. Through the energetic foresight of its Metropolitan District Commission, Hartford, Conn., and its suburbs is one of them.

Hartford has a long history of sound waterworks management. Its past and present engineering leaders have fought tooth-and-nail for adequate and safe supplies. But, like a lot of expanding communities, its water consumption is climbing sharply. Doubled in 25 years, quadrupled in 50, until now it stands at about 52 mgd put over the safe yield of 50 mgd. (The safe yield, of course, is the dependable quantity that may be taken day after day, month after month, under extreme drought conditions such as that in 1880.)

• **No shortage.** This doesn't mean that Hartford is faced with a water shortage. It simply points to the wisdom of preparing ahead to fill the needs of an ultimate fast-growing metropolis.

The Hartford metropolitan consumption tells the story of a healthy community. It's growing. People find it profitable and enjoyable to live there, as indicated by the fact that the population has increased 50% in the last three decades to about 250,000 in about 20 square miles.

Many of these facts the engineers went to this effort and the people had to vote and sell them on the necessity of adding to and improving the existing excellent supply.

Next, expert support was enlisted. Guided by the district's engineers, the citizens and experts hammered home the need for more water to assure industrial development and safeguard public health. Competent public speakers toured the area, met with civic groups and kept the cudgels in the public eye up. As a result the legislature saw the point. And the voters voted a $8,000,000 bond issue for the Hog Back project that will double safe yield to 50 mgd. In a rather startling 7-to-1 vote.

• **The Hog Back Project.** This project now being designed consists of a concrete dam 1,650 ft long and 150 ft high, a 900-ft-long earthfill reservoir on the west branch of the Farmington River and a 3-mi discharge tunnel. The dam will be 150 ft high and 900 ft long. The reservoir will extend about 3.5 mi upstream from it and be about a third of a mile wide. The tunnel—3 mi long and 8 ft in dia—will take off from the reservoir just above the dam, pass under a mountain and empty into the existing Burkhamsted Reservoir. Water is conveyed from this reservoir by conduits to the distributing system of the district.

When the Hog Back development is complete, engineers estimate that Hartford will have a dependable water supply until at least 1975.

• **The MD sells water.** The Metropolitan District believes in sound business management. All water consumed is metered (100%) and every consumer pays for exactly the amount he uses. The only exception to this is water all metering is connected for direct sprinkling and fire fighting. The district supplies these services free as a public service.

When a contractor takes water from a fire hydrant for building operations, a meter is installed on the hydrant and the contractor pays for all water drawn. No guide has to be given for the water he uses, for installation and removal of the meter. The district believes that no one should get for what they use.

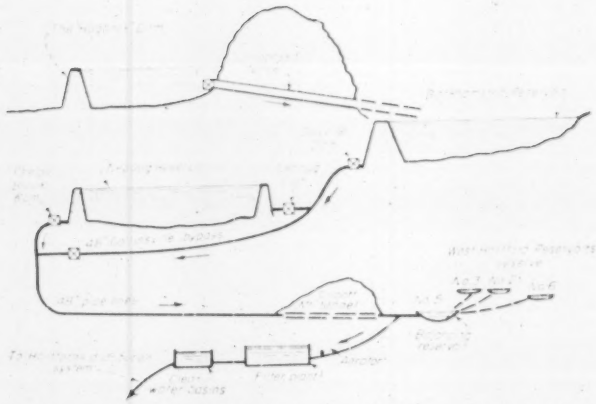
The district's long-standing retail rate for water—established in 1926—was 15¢ per 100 cu ft. But several years of deficit operation—due to sharply rising labor and maintenance costs—used up an accumulated surplus. To put the system firmly back on a paying basis, this rate was increased 20%—to 18¢ per 100 cu ft up to 3,000 cu ft—on Jan. 1, 1948. This brings in sufficient revenue to keep the system at top efficiency and to finance new supplies.

The wholesale rate (above 3,000 cu ft), which applies to large industrial consumers, is one-half the retail charge.

The average bill for a single family comes to about $4.00 a year for normal consumption. This is, in the view of many a rate-payer in other cities, a very small price to pay for such an essential and necessary commodity.

• **Credit is due.** The people of Hartford can take their hats off to the commission and its engineers. These public-spirited men stubbornly knocked down all obstacles that stood in the way of water supply development by candid publicity and good teaching. Their success is a good example for engineers who have long been urged to take the lead boldly when new public works are called for in their communities.

The commission's chairman is L. N. Wilcox. J. Wesley Libby is chairman of the Water Board. The District Manager is W. V. D. Wintz and the chief engineer of the Board is W. V. Center.



DEPENDABLE YIELD of Hartford's water supply system will be doubled, to 50 mgd, by the Hog Back project. Reservoir will hold 6.5 billion gallons.

profit-wise Contractors buy MICHIGAN 1/2 yd. Crawler Cranes!

There's no other half-yard crawler crane excavator as good ... dollar for dollar ... as the MICHIGAN! Why? Because only MICHIGAN gives you these job-proved, "big-machine" features.

Independent travel to save minutes on every move, hours on every job. Tractor-ease steering to enable faster, easier maneuvering. Automatic, self-locking crawler brakes to give complete safety when working on grades. Smooth fingertip air control to eliminate operator fatigue and that "afternoon let-down."

But, that's not all. There's the oversize internal tooth circle gear ... the hook rollers and independent drum assemblies ... and there are many more. Compare MICHIGAN with any other half-yard crawler crane ... then you, too, will agree it's your best buy! Take the first step in getting more for your money ... write, wire or phone for complete details.

MICHIGAN POWER SHOVEL COMPANY

500 Second Street, Benton Harbor, Michigan, U. S. A.

INDEPENDENT TRAVEL — Standard equipment. Crawler mechanism powered through intermediate shafts, forward and reverse gears ... not through swing gears.

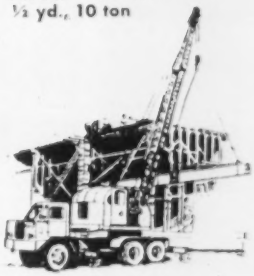
AUTOMATIC-LOCKING BRAKES — Hold crawlers against down-hill movement when working on grades. A feature operators appreciate. Brakes lock instantly, are released by air rams.

TRACTOR-EASE STEERING — Operator can maneuver a Michigan accurately and fast because it steers like a tractor ... steering brakes are used in stead of conventional jaw clutches.

FINGERTIP AIR CONTROL — Air pressure to a clutch ram is regulated instantly as operator desires, thus giving him complete control and "feel" of the load at all times.

Model T6K
3/4 yd., 6 ton

Model TMDT-16
1/2 yd., 10 ton



Model TLDT-20
12 ton

Series 8
1/2 yd., 8 ton

Model C-16
1/2 yd., 8 ton

How to make a grader's front wheels last

THE front wheels of a grader run into some rough going—but if they're equipped with Timken® bearings they can take it. That's why the Galion Iron Works and Manufacturing Company specifies Timken bearings for all their motor graders. Timken bearings reduce friction and wear, help prevent breakdowns, keep maintenance to a minimum.

Due to their tapered construction, Timken bearings take radial and thrust loads in any combination. Their true-rolling motion and incredibly smooth surface finish enable them to operate freely and almost frictionlessly. Line contact between the rollers and races provides extra load-carrying capacity under even the toughest loads.

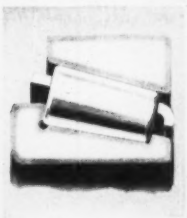
Timken bearings normally last the life of the machine because (1) they are engineered for the job, (2) are made of Timken fine alloy steel, (3) are precision manufactured. And since they permit tighter closures, lubricants are kept in—dirt and moisture kept out. Maintenance time and material costs are greatly reduced.

No other bearing can give you *all* the advantages you get with Timken bearings. Backed by more than 50 years of bearing research and development, they're first choice throughout industry. Use them in the machines you build—look for them in the machines you buy. Be sure the trade-mark "Timken" is on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means it's bearings are the best.

THE GALION IRON WORKS AND MANUFACTURING CO. assures long life and trouble-free performance for this model 204 motor grader with Timken bearings in the wheels.

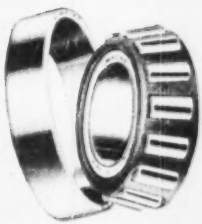


GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design, 2. precision manufacturing, 3. rigid quality control, 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION